ELECTRICAL REVIEW

[ILLUSTRATED.]

A WEEKLY JOURNAL OF

ELECTRIC LIGHT, TELEPHONE TELEGRAPH AND SCIENTIFIC PROGRESS.

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The Ross Door Connection.

The Ross Door Connection is an efficient method of converting a mechanical door pull into an electrical door pull. Very often, when a fine residence is equipped with a mechanical pull, it is desired to introduce an electric call, and, by placing this connection inside, and connecting the arm to the wire of the mechanical pull, the object is effected without marring the finish of the inside or interfering in any way with the outside frame of the door. These door pulls are being introduced by the Western Electric Company, a cut of one appearing on this page.

The Chinnock Current Arrester for Telephone and Telegraph Lines.

We present this week a cut of a new device designed by Mr. C. E. Chinnock, for protecting telephone and telegraph instruments from lightning, or from excessive current when a cross with electric light or other wires happens. There are a number of safety devices already in use, but for simplicity, cheapness and adaptability, this device of Mr. Chinnock's should command the careful attention of all telephone and telegraph companies.

The cut on this page shows the full size of this safety catch.

It will be seen that there are two parts; the black rubber base with brass plates at each end having screws under which to place the wires, and the center piece C, which holds a piece of fine lead wire. This center piece is slotted, and, when the safety wire is burned off, can be taken out by giving the screws A and B a turn. A new piece is put in and the circuit restored. This can be done in less than half a minute, as will be readily seen by examining the cut.

These current arresters are manufactured and sold for the inventor by the Stout-Meadowcroft Co., 21 Ann street, New York, who will furnish one sample free to any telephone company requesting the same.

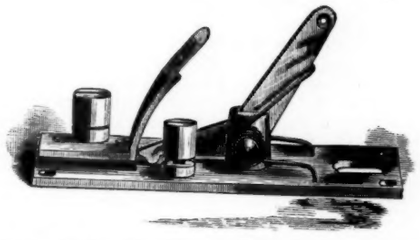
The Question of a Mutual Electric Light Insurance Company.

INTERESTING DISCUSSION OF THE MATTER—VIEWS OF PROMINENT ELECTRIC LIGHT MEN.

The adoption of a resolution favoring the organization of a Mutual Electric Light Insurance Association, by the National Association at Baltimore, occurred in the closing session, and followed the very able and comprehensive paper prepared and read by Mr. C. J. H. Woodbury, of the Factory Mutual Insurance Company, of Boston. This paper was received with applause, and on its conclusion President Morrison stated that "The insurance men of Baltimore were invited to be present at this session to listen to the paper which has just been read, because of the title of the paper—The Relation of Electric Lighting to Insurance Business. If there is anything in the paper that they desire to criticise, we would be glad to hear from them."

Mr. Wilkinson, of Baltimore—"I desire to say that I think all of us appreciate very highly indeed Mr. Woodbury's paper, and so far as the insurance part of it is concerned, must necessarily indorse it, because his experience is perhaps the best of any man in the country, and we tender our thanks to the president of the association for inviting us to be here, and to Mr. Woodbury for presenting this very interesting paper."

General James Anderson, of Baltimore—"I have listened with a great deal of pleasure to the paper and, speaking for the underwriters of Baltimore, I have to say that we are entirely in your hands, so far as electric lighting is concerned. We are not favored in the city of Baltimore as other underwriters are in larger cities than ours, where they have careful supervision and constant



ROSS ELECTRIC DOOR CONNECTION—WESTERN ELECTRIC COMPANY.

inspection of the wires. You are aware, sir, that we have had comparatively few fires from the electric light in Baltimore. I cannot remember more than two or three. We are pefectly satisfied that if the wires are carefully and properly introduced, and looked after almost every day—speaking from my standpoint, without any knowledge whatever of the force of the electric current—I am perfectly satisfied that they are quite as safe, if not more so, than a gas light. I have seen our bay steamers where they have the electric light, and the persons employed on them assured me that they gave a great deal more satisfaction than the gas light did. I have only to say, sir, that by carefully introducing them in warehouses and dwellings, I am satisfied for my own part that the electric light will be of very great advantage to us. I speak with diffidence about this matter, for I had occasion two or three years ago to speak to a gentleman in regard to the electric light, and I remarked to him that this system of electric lighting is yet in its infancy. He said 'My dear sir, it has not been born.' I and my colleagues here of the insurance fraternity are very grateful for the paper which the gentleman from Massachusetts has read before this convention to-day." (Applause.)

Mr. Ridlon—"I would like to say a few words in addition to what Mr. Woodbury has already said, and perhaps it will be somewhat to the benefit of the insurance men. We have in Boston a New England Insurance Exchange of which all the insurance companies appoint a secretary, and he occupies an office, and they appoint an inspector of local plants that are put into buildings, stores or factories throughout the towns or cities of New England, that are not in the Manufacturers' Mutual Insurance Companies—they come under the head and inspection of this bureau of insurance. They are all very nice gentlemen, and they are all very anxious to do just what is right in regard to this matter; but they lack a great deal of information and they lack organization also; that is, they are living some forty miles away from Boston, and it has seemed almost impossible to get them. I had a little experience in getting hold of their inspector myself, although I went 125 miles to meet him. I notified him that I would come back to meet him in Boston. When I got to Boston they said he would be in in a few moments. I go back and found a telegram that he was there where I went to meet him. I went back and did not meet him, and it was three or four days before we got together. Now I suggest to them, for the purpose of adding to their information, that they invite the electric light people to meet them at least once a month or two months, as circumstances may require, and go into all the details of any new improvements for the protection of buildings from any fires that may occur from electric light plants. The party putting in the electric light plant has much more at stake than they have. We cannot afford to have any fires. It would be very detrimental to our business; and they have taken to that idea very kindly, and proposed to meet us in that way, thereby gaining a better knowledge than they have. Then as there is a large number of wire companies, wire men who are employed by the different electric light companies for wiring these places for the purpose of electric lighting, those people doing this work should receive lessons from the Insurance Exchange, and have a system of instruction the same as is required in the case of an engineer before he gets a certificate qualifying him to run an engine. I think you will find that a very great improvement here, because the thing branches out from this city to other places. Somebody will want answers to some questions. You will want to know what kind of wire, what size of wire, what covering of wire, and what is necessary for the different conditions in which a building may be. It may be damp in some places, and require an an additional insulation, and you, of course, will be asked by the party owning the building to insure it, and you want to be able to tell him to accept it or not to accept it, and to give him a satisfactory reason for what you advise. That is a matter which is coming up with us. You do not see the necessity of it to-day, but I think you will in the future, and I should like to have this additional matter added to Mr. Woodbury's report. I would add to this that this matter refers to property where the mutual company would not have control. It would come under the general insurance."

CHINNOCK CURRENT ARRESTER.

Mr. Gilbert—"One matter, I think, has escaped the attention of the convention in respect to reducing the cost of producing the electric light to the local companies, and that is the matter of insurance. We have been rated in our local companies as extra hazardous, when every man knows that the station is constantly under the watch of some of his employes, and that it is exactly the reverse. In the name of the New Haven company we sent a circular letter to about one hundred of the local companies, and if you will permit me, I will read the letter. (This letter appeared in the REVIEW of January 30.)

"We sent out more than one hundred of these, and received replies from thirty-one companies. The total estimated loss in case of total destruction, was $1,178,000; amount of insurance carried, $481,000. Premiums paid varying from three-fourths of one per cent. to four per cent. Total premium paid on the amount insured at these rates for three years—three years being the time that several of the plants said they had been in existence—amounted to $19,112.25. The total loss in three years by fires amounted to $1,000 or 7-10 of a mill on the amount insured. Were we to organize a mutual insurance company, with a governing board to consist of members of the electric light companies, we should not only be able to reduce the cost of insurance, but we should be in a position to reduce the amount of loss in this manner: that is, in case we have a loss—as I know the loss in one plant was—of $550, caused by a dye works taking fire, adjoining the electric light station, then going into the four-story building occupied by the electric light, and burning out three stories of it, taking the adjoining building, and burning three stories of that. The insurance companies paid $550 loss. We claimed all we could, and got $550. I suppose we were to blame for making the stock companies feel that this risk was extra hazardous. In this case, the actual loss, after settling and finding that we would not go to the parent companies, was $150. Another case was caused by the explosion of a kerosene lamp in the station, which cost $100, and the third was from lighting. If the actual loss on those plants was the same as our loss in New Haven, instead of being 7-10 of a mill on the dollar, it would be about 2-10 of the same amount of premium paid. If we have a mutual insurance company governed by members of the electric light companies as

directors, in case we have a fire in a station, I think we can have an organization by-and-by, which will enable us to oblige the parent companies to repair our dynamos, etc., at the actual cost of the labor and material, they having once had their profit for their patents, and are not entitled to a second profit. But where we are obliged to insure in the stock companies, and pay these high rates, the parent company gets the benefit of a second profit on this plant, which they are not entitled to. There are only thirty-one companies who replied to these reports. We believe that there would be in the United States an insurance of at least five millions on the present companies now existing, and in five years, it is my opinion, it will be trebled. We know that some of the mill companies will take our insurance for less than we are paying now, but I do not think we should be so well fixed as by having a mutual company formed of the electric light companies. I know a case in one of the stations I am connected with, where there was a slight damage to one of the dynamos. The parent company was called upon to examine that dynamo and report the expense of making it good. They sent in their report, and it cost $234.30 to repair the damage. That, of course, appeared outrageous, and so the superintendent of the station took one of his best men, who said that he believed he could repair it. He procured him all the necessary materials and tools, and when he got through, he put the dynamo in, and it was running in as good order as if it was sent to the factory. The actual cost was $24.30, and the two bills we have pinned together and are going to frame. I really do not blame the stock companies for regarding it as an extra hazardous risk, because the parent companies are to blame for getting a second profit out of us, when they have already had one.

Mr. Cleveland—"Residing in an insurance city, it has been very convenient for me to get information upon this plan that has been so clearly explained by Mr. Gilbert, and I am quite sure that his statements are correct. I am also sure that this association will approve his plan. It is fair to say however, that Mr. Gilbert and his friends will not depend upon any action of this convention in regard to carrying out his plan of organizing his company. But what he desires is that this convention shall approve and take an interest in it, as I have no doubt you all will. I therefore beg leave to read a resolution:

Resolved That the association endorse the plan of an organization of a Mutual Electric Light Insurance Company, and that the chair appoint a committee of three to perfect such organization."

The President—"I am not sufficiently familiar with the insurance business to pass any opinion upon it, but upon general principles I am opposed to going into any business outside of that for which our association was planned. I am equally opposed to lending the name and sanction of this association to any scheme outside of the legitimate business of the association. When this question is called therefore, I shall vote against the adoption of the resolution, for these reasons."

Mr. Cleveland—"I do not think that is a fair way to put it. Here are members of this association from all parts of this country interested in the economy of running their plant. Now it is very clear to me that if those gentlemen can organize themselves harmoniously into a self-protecting insurance company, this association is lending no influence to it; the individual members are and they have a right to do that, Mr. President, I take it. Now you go up to Hartford where there is some competition in insurance and you go to the company that will sell you good insurance the cheapest and you buy there. Now suppose Mr. Gilbert and his friends organize this company. Here is a man wants to insure his plant. This organization will insure him for one-half what a stock company would charge him. Now is there a man running an electric light plant in the country that if he could get at that organization would not get his insurance there. He would get his insurance in the cheapest place he could obtain it. It seems to me that the members of the association have a right to lend themselves, using your phrase, to an arrangement of this kind, so that they can save money in their insurance. I look upon it as a fair and honorable and economical business enterprise for the Electric Light Companies, and I hope this association will pass that resolution."

Mr. Ralph W. Pope—"As there are gentlemen here who are acquainted with the rates of insurance, I would like to inquire as to the comparative rates. It seems to me very important that electric lighting stations should not be rated as extra hazardous, when, according to the statistics just read, they appear to be extra safe."

Mr. Morrison—(Mr. Weeks, vice-president, in the chair)—"I came on the floor to say that I do not want my language so construed as to mean that any member of this association in his personal capacity has not the right to go into any business that may suit his taste and judgment. It seems to me that the paper which Mr. Woodbury has read to-day will go further toward lowering the rate of insurance than anything you can do in the way of holding the promise—I won't say the threat—of an organization over the heads of men who are already engaged in their legitimate business. I do not understand anything about insurance, but I do understand something about the National Electric Light Association, and the ground I am taking is that you are going beyond the object for which the National Electric Light Association was inaugurated. I do not mean to say that you could or could not get the insurance. Our Baltimore station is satisfactorily insured. It is insured to the satisfaction of the Board of Directors."

Mr. Woodbury—"Members of the convention while in Baltimore have availed themselves of the opportunity to visit the Brush electric light station and noted the extensive plant, the solid building, and the order and system which prevailed over the whole establishment; perhaps some have gone so far as to notice the extent of the equipment for protection against fire. It is a matter of satisfaction to learn that the insurance of this establishment has been so satisfactory in every respect, as it is the only electric illuminating station insured by the Factory Mutual Insurance Companies." (Laughter.)

Mr. Linnell—"I would like to make this statement and give one illustration of why as the representative of a manufacturing company, and therefore being directly interested in a large number of sub-companies, I would like to support Mr. Gilbert's suggestions with all the sincerity that we can lend to them. But I only wish to occupy your attention to quote one illustration. I have just come from Richmond, Virginia, and during the fourteen days that I was there six fire insurance companies of the United States cancelled successively six insurance policies, and the reason that they gave therefor was this—not that the building, not that the apparatus in the building, not that the connections used there were not perfectly satisfactory, because they had all been passed by the insurance inspector, but they gave as the reason this, that it was the first electric light station in the City of Richmond and they had not had sufficient time to investigate the matter in relation to the city to give us the insurance. I will mention one company in Hartford, which refused to insure the station on that ground, that is the Hartford Fire. At the same time they say 'we will insure your station for one and a-half per cent, not for anything less,' and the consequence is that that offer which we made to have the station insured at one per cent. was rejected in fourteen days by six consecutive companies, and to-day we are insuring our station at one and a half per cent. We have other illustrations of the same nature from Maine to Mexico and Missouri where we are meeting with the same difficulties with insurance companies all over the country; and having seen six successive companies cancel six successive policies of that grade, we feel that we would like to enter into the organization of a mutual company and do all we possibly can to assist in the organization."

Mr. Woodbury—"As the theme of my discourse here was on an entirely new phase of subjects relating to electricity, and as the insurance interests that employ me do not propose to enter into this insurance, I can speak upon the subject very freely. A few weeks ago Mr. Gilbert, with some of his friends, called at our office with inquiries to know if their electric light station could be insured in the Factory Mutual Insurance Company. Our first reply was that that matter would be very undesirable, irrespective of any question as to the risk attached to an electric light station, for the risk of an electric light station isolated is very small. Our experience for thirty-five years, to the amount of $59,338,000, has been a loss of eleven cents and seven mills per hundred dollars of insurance per annum—less than one-eighth of one per cent. Now some reference is made to this Mutual Insurance Company. All insurance is a tax. It is the heaviest tax in this country. It is the distribution of the losses of the few to the many. The cheaper the administration of that tax can be carried out, the better it is for all interests. The amount can be fixed most equitably by class insurance. About fifty years ago Zachariah Allen, of Providence, built a mill in which he introduced many improvements of equipment and construction. It was the first property with a pump for fire purposes only, and it had besides many other original features. After the mill was finished, he submitted his plans to the president of the insurance company in Providence and was listened to with satisfaction. At the end of his interview he said: 'Now, Mr. President, you have appreciated my effort to reduce the hazard of fire in this mill. I wish you to come up to my mill and examine it for yourself, and from your experience in such matters make up your mind as to the probable hazard of that mill, and charge me a diminished rate accordingly.' The president of the insurance company replied: 'Mr. Allen, a cotton mill is a cotton mill, the rate is two and a half per cent., and we have no time to go into the country to examine your Yankee notions.' As a matter of fact, a contract was made between manufacturers there by which they agreed to make special alterations and share each others losses. An insurance company was formed on that basis. These Factory Mutual Insurance Companies have confined themselves to thoroughly protected isolated manufacturing property of good construction, and by keeping themselves in that class they have been remarkably fortunate. They now carry a little over four per cent. in a month of all the insurance in the United States. Last year they wrote four hundred and five and a half million dollars. Their losses by fire were thirteen and one-tenth cents on a hundred dollars. The cost of taxes and net cost of administration were about two cents more, making the cost of insurance fifteen cents in a hundred dollars. Supposing you thought fit to insure your electric light station, if you can get the owners of enough stations, not those who are merely tenants in buildings, but where you are entirely separated as in this Brush station in Baltimore, you could certainly form a very successful company, sharing your losses, and by conducting it with economy it would be the cheapest method, undoubtedly, of protecting against fire. But there is no magical result of diminished cost in the matter of mutual insurance. The plant has to pay the average cost of the chance of destruction by fire. You make a selection of those risks, keep them together and your chance of fire will be small.

"In regard to what the last speaker but one said—not being a member of the association I cannot advise, but it seems to me that the voice of this meeting would be merely advisory, perhaps commendatory of such a measure; but whatever is done must be done by the individual action of some of you. The Mutual Insurance Company do insure one very excellent electric lighting station. I do not think that they carried it beyond that. There are very few such nice stations as the one in Baltimore. It is a class of very small hazard, and something that you ought to control yourselves. I believe you have got the self-discipline in the business of electric illumination to accomplish those results. Of course there is more or less machinery to it. One great feature besides the selection of risks is the continual inspection by trained inspectors. The rubber interests, who wish to be insured, formed their own company, carrying a number of million dollars now. There are some at this convention who are insured in that company, if I remember right. It seems to me that the limits of this meeting would be advisory, as a matter of one individual with another. But I will say, however, that the New England Cotton Manufacturers Association very frequently considered questions of this Factory Mutual Insurance not binding the members, however. A number of members of the association are connected with property insured in the Factory Insurance Company, and insurance is one of the constant taxes upon property, and therefore a factor in the prosperity and in the cost of production, and anything that helps that matter of course adds to the prosperity of the business in which you are engaged."

Mr. Renshaw, Washington, D. C.—"I would state that within the last year, we have suffered from fire in Washington. We had our station destroyed during the last summer, and owing to the general prejudice that insurance companies seemed to have in that locality, we carried very little insurance, and our loss was very heavy. We have now a very fine station, isolated by itself, and the risk of fire is very slight; but if that could be insured at a reasonable rate, we would be pleased to carry an insurance. I should think it would come fairly within the scope of this organization to encourage the formation of any insurance company that could reasonably insure without any prejudice, and where we may not lend ourselves to the formation of a company, I see no reason why we should not encourage Mr. Gilbert in his enterprise."

Mr. Rorison—"I would like to ask Mr. Linnell whether the decision in Richmond of the six companies as to the rates charged was not merely the judgment of one man, and he the manager of the local combination."

Mr. Linnell—"In reply I would state that the policies were all issued through the agency of one man, as he suggests. Whether he was the committee of the board or not, I am not positive. But they certainly were obtained through his agency, and at the same time from the fact that he interested himself in the obtaining of six different policies, it would seem that he was desirous of getting insurance for us, since we refused to insure longer than a given period of time until I could ascertain what action this meeting took in relation to that tax."

Mr. King, of Minneapolis—"I think in a general way our company would favor the organization of such an association as is proposed. In our own case, we have taken all the precautions we could think of for our own protection, and I think we are paying one and three-quarter per cent., and we would like to reduce that, if we can, with Mr. Woodbury or some other man."

Mr. Gilbert—"The thirty-one companies that I received communications from are paying an average amount of $1.65. This matter I have brought before the convention, because those who replied to the letter seemed very much interested in it. I talked the matter over with Mr. English, and we did not know whether to discuss it here or in the room. As there seemed to be so much interest in the matter, we thought the only place to bring it before gentlemen concerned in the matter was here in this room."

Mr. Weeks—"Our rate was fixed at $3.10 at Kansas City, and I called on the manager of the board and told him if that was to be the rate we would carry our own insurance or go outside the board. It was finally readjusted at $1.45, which rate we are now paying on our insurance."

A Gentleman—"If the Richmond risk our friend refers to is rated at one and a half, is not it possible that there may be an electric-light station in the United States that it is worth that to insure?"

Mr. Woodbury—"I think so."

Mr. Mullen, of Philadelphia—"It seems to me a matter of ignorance on the part of insurance companies as to the rate they charge. In such companies as the Imperial of London, the London and Liverpool and Globe, and the Niagara, I have just placed an insurance at three, which is the lowest I have ever placed; the usual rate with us is about one per cent."

Mr. De Camp—"I see no impropriety in this association endorsing that. It resolved itself into this—whoever has charge of it and has the labor of getting that into shape—there may not be enough people to respond and make it an object to form a company. Speaking for our own company simply, our rate is a reasonable one, and as low, I think, as we could expect. I would have no objection to voting for that resolution with a little alteration—that the committee of three be stricken off. We certainly can afford to endorse anything that is going to result to the benefit of our companies in reducing our expenses. I will get at it by striking those words out."

Mr. Cleveland—"The resolution now reads:

"*Resolved* That this association endorse the plan of an organization of a mutual electric light insurance company.

"I want to say in justice to Mr. Gilbert, you do not know him as well as I do. He will not be likely to start an enterprise of this kind and give it up. Now, we shall have a mutual electric light insurance company, I guarantee."

Mr Morrison—"The principle of endorsing the plan was the one I objected to. I object to the endorsement by this association of any scheme outside of that for which the association was organized. I therefore vote No."

The resolution was adopted.

The Incandescent Electric Light for the Magic Lantern.

In the magic lantern as in every other invention, constant efforts for improvement have been made, and the magic lantern of to-day is a vastly superior article to that of only a few years ago; but the question of a suitable and economical light is still an unsettled one. Lamps, candles and gas have their objections on the grounds of heat, smell and smoke, and the calcium light—while better than any of them—is objected to on account of expense and inconvenience, and, by some persons, on the ground (remote, perhaps) of danger. It has been considered a great desideratum to obtain an electric lamp for the lantern, which, being of sufficient lighting power, could be operated easily and cheaply by battery, whether among the conveniences of a city or in remote country villages.

Messrs. Stout-Meadowcroft, of this city, have prepared a convenient apparatus as just mentioned, and its simplicity is such that it may be described very briefly.

The incandescent lamp shown in the cut is the means of illumination. This lamp screws into a stand, which fits into the lantern. The stand is arranged so that the lamp may be raised, lowered, pushed forward or drawn backward, so as to make a proper focus. Two ends of a flexible silk-covered wire, four yards long, are fastened into binding posts on the stand, and the other ends connected to the battery. The battery consists of twenty compact cells, having all the elements fastened to one hard rubber top, by which all the elements can be lifted in or out at once. The three-cell battery is shown herewith, the one used by this company being of the same kind of only two cells. All that is necessary is to fill the cells with the battery fluid, put the top on, and the lamp will light. The battery will light the lamp about two hours, after which the liquid may be emptied and the battery refilled for further work.

The light obtained from this lamp gives an effect equal to an ordinary calcium light, and is perfectly steady and white.

* * A scientific journal in England estimates that it would take a capital of $5,000,000,000 to successfully divert the vast power of Niagara Falls to useful purposes.

BUFFALO ELECTRICAL NEWS.

[From our Staff Correspondent.]

Some six years ago, when the electric-light business was in its bibs and long dresses, a company had the temerity to attempt business here. After no little skirmishing, this was brought about by a proposition to light Ganson street—a city contract—with twelve lamps. The locality is one of coal yards and trading vessels and the repairing of lake craft, and the extent of territory about 4,800 feet. The company was permitted, by the terms of the contract, to light other premises, which was considered a rather nice arrangement.

The contract was for three years—the twelve lights burning every night and all night; the remuneration, $5,000 per annum for three years. In addition to the city lights, there were several lights furnished by the company to private parties, and everybody was fully persuaded that the lighting business was a bonanza. At the close of the third year the slate showed that the company had amassed the enormous sum of nearly $500, or about $166 per year.

It was not remarkably encouraging, but again the attempt was made nearer the center of the city. The second attempt was made with a plant to light portions of Main and Washington streets. Considerable skirmishing with the council committee resulted in a contract, which required that every arc light should displace seven gas lamps. This was in the days when an arc light was both assumed and supposed to measure 2,000 candle-power. By an error in calculation, the light company exceeded their contract by three-sevenths of a gas lamp, and all was very satisfactory.

Experience is said to be an expensive teacher, and it may also be said that it is a very exacting one.

The company endeavored to do business on an extensive scale from several local stations. Three of these were run, and at the end of nearly three years the company's affairs were in a discouraging condition, so that the faint-hearted stockholders fainted and fell by the wayside, leaving the solid and sturdy to bear double burthens. A lesson had been learned, and, profiting by the knowledge thus gained, the company, reorganized and reinforced financially, abandoned the three scattered stations, and concentrated their works and thoughts upon one grand establishment, which should be large enough to temporarily cover the requirements of the business, and allow for all reasonable expansion for years to come.

The locality chosen for the new station is at the corner of Mohawk and Wilkinson streets, on the west side, where a building of brick was erected, with a boiler-room 120 x 50 and a dynamo-room about 60 x 110. In this last are fifteen dynamos, all sixty-five lighters, connected in thirteen circuits, only one dynamo being held as a "spare" for emergencies. These circuits will average about thirteen miles each, the longest measuring twenty-two miles. The farthest light is something near seven miles from the generator.

On the second floor of the substantial brick edifice are testing and store-rooms, repair-rooms, etc., all as convenient as it is possible to make them. An interesting and essential feature is the galvanometer-room, where every day the circuits are tested for ground contacts. The apparatus for this purpose is extremely simple, yet effective, and its use is thorough. It consists simply of a Gamewell & Co. galvanometer and a few cells of Calland battery—only this and nothing more.

The dynamos, which are run by individual Westinghouse engines, are ranged in "two ranks, open order," down the center of the room, with plenty of space for convenience and safety, the circuits being brought to a general switch-board at one extremity of the room.

In addition to the city lights, there are, of course, many of an individual character, the grand total counting up to very nearly 800.

The machines and lamps are all, and ever have been, of but one variety. The company commenced business with the Brush outfit, and has never faltered in its allegiance, never failed in its loyalty, and, from the minister's-coming-an'-we're-out-o'-meat perseverance which has heretofore characterized the transactions of the company, probably will not—at least while the present management exists.

During the earlier years of the company's experimenting the field was left clear to them, because there was apparently nothing in it; and to-day it is abandoned to them for an equally cogent reason—they control the field—a clear case of what perseverance and grit will do against adversity.

This electric-light central plant business bears a certain resemblance to the insurance business. Losses from various causes are not only possible—they are positive, and must be anticipated. With a pair of dynamos and, say, an average of eighty lights, an accident cuts off one-half of these for one, two or more nights, and eats a very material hole in the revenue.

But, when one has compassed a plant of ten or twenty times these dimensions, there is less running expense for light, the losses average much lighter, and the profits consequently average and aggregate much more satisfactorily. As a small conflagration may swamp a junior insurance company, while a venerable gray-headed patriarch in knee-breeches and cocked hat would laugh at the loss as insignificant, so the eighty-light chap would fume and fret over a stoppage which would hardly be a drop in the bucket to its colossal cousin.

And so it has happened that, while other companies have been repeatedly represented by agents, who have come, and seen and prospected, and pondered and departed, the Brush Electric Light Company has to-day the only electric light, either arc or incandescent, known to the good people of Buffalo, save as they have found them away from home.

The Bell Telephone Company, of Buffalo, have about 1,600 *hello!* lines within the city proper, with 75 miles of poles and some 625 miles of extra territorial "HELLO!!" and "HELLO!!!" lines, these extending through the northeastern counties of the State—the local company controlling the "hello" business of seven of these.

The system of rentals here is peculiar, and quite nearly resembles that practiced in Milwaukee. A minimum rate of $50 per year, with the privilege of 500 connections during the twelve months, is charged for an ordinary line within one-half mile of the office. When this number of communications is exhausted, an additional hundred is furnished for $6 for a line in excess of the above length up to three-quarters of a mile. The minimum rate is $55 for the next quarter of a mile; $60 for the next, and so on. The rates for additional connections, after the first batch is exhausted, varies with quantity like those of any other form of merchandise, of course the jobber paying less than the individual consumer; for everywhere, as you step up to an instrument, the uncomfortable vision flits before you of a damsel in her night clothes, drying her night-cap on a cane or a curtain stick, holding an awkward gridiron in her right hand and facing backward, as if remarking to her invisible partner something about a better fire or a late breakfast—a picture we have probably all seen on the standard two nickel-piece.

The fraternal feeling existing here between the electric light and the telephone people is a splendid exemplification of the lion and lamb days which are laid up in the future for us all.

The love exhibited is beautiful to witness and much to be commended. Could Hubbard, of Milwaukee, and Morrison, of Baltimore, but behold this genial exhibit of brotherly love and forbearance, all past differences would melt in the warm, benevolent glow, and the world would be the better prepared for the millenium. These good neighbors not only do not quarrel, but they run their wires upon the same poles, the big, powerful brother consenting to keep on the lower arm or pin, while the weaker brother lords it over him from above, and never kicks at removal when his presence is too immediate for his tender friend, and the latter, while ever respectful, never fails of having all reasonable wishes gratified by his herculean friend and comrade.

The wires here have not as yet arrived at that point in the scale of nuisances when an underground agitation is quite in order, but the good people are dreading the day when some solon in the municipal board shall introduce an ordinance paving the way for unpaving the streets while an underground system is being put in. Why, the people here are actually so far behind the times practically that some even doubt the possibility of working any kind of electrical wire under the surface on account of the induction, or the retardation, or the leak, or the —— some other enemy to the well-being of the electrical fraternity. The wires are all on poles, and curious enough it seems to one from Chicago, where so much has been said and done in this direction, to be in a city of this size, where there are no restrictions on wires.

The day will come, however, so surely as progress moves to the front, and revolutions never go backward, when Buffalo will fall into line, as other cities have done and are doing.

At the time of the Electrical Society craze, years ago, when the American Electrical was organized, Chicago, Cincinnati, New York, and almost any number of other towns organized what were intended as auxiliary societies.

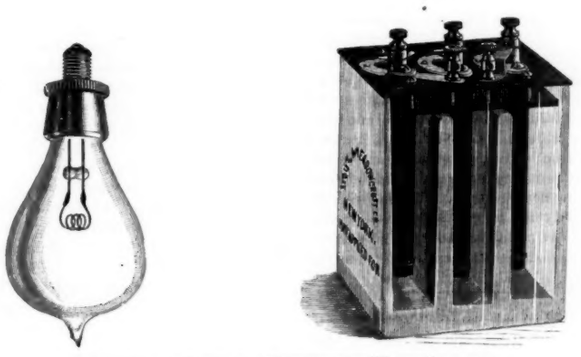
To-day, of such auxiliary societies there are very few left, and of these Buffalo has one of the best. The burthen of holding this together, of keeping up the interest, devolves upon a minority, but the society never misses a date, never fails of something to interest, when the evening comes round.

Friday, the 19th, was a regular meeting night, and on taking the chair President Kitton made some pertinent remarks on the interest just now developing in every department of electricity, and advocated action in the matter of inducing all who are so interested to become members of the society. The suggestion was well received, and the fact was enlarged upon that telegraphy was but one of the branches of electrical knowledge, and that papers upon other branches of applied electricity would be acceptable, and the field of the organization correspondingly enlarged. So, on motion, the secretary was instructed to prepare circulars for distribution among the electrical students and workers of whatever class, who are desirous of knowing more of the mysterious force.

The society next indorsed the action of the National Telephone Exchange Association relative to wire gauge. After some other routine business, the members listened to a paper by S. T. Davidson, traffic chief of the Western Union, on the quadruplex system, and the use of the condenser in multiplex telegraphy. Mr. D.'s explanations were particularly well adopted to capacities of his hearers, and the paper was deservedly well received.

The grit and grip of the Buffalo boys, Kitton, Burnett, Buell, Fenn, Davidson, and others, whose names refuse to come at the call of memory, entitle them to every credit for holding this society together. Much good is the result of this sort of association, and their action in providing entertainment and instruction in this way must furnish a pleasant retrospective remembrance to those who thus gather from their older or better-versed associates the assorted gems of electrical knowledge.

BUFFALO, N. Y., March 6, 1886.



INCANDESCENT LAMP AND BATTERY FOR MAGIC LANTERN.

Electrical Review.

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We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

Subscribers can at any time have the mailing address of their paper changed by sending both old and new address.

Frank M. Gilley. 54 Equitable Building, Boston, Mass., is our New England representative.

Mr. C. C. Haskins, 118 LaSalle Street, Chicago, Ill, will represent the REVIEW in the West.

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NEW YORK, MARCH 13, 1886.

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The directors of the American Electric Manufacturing Company elected last week, include in addition to the gentlemen who have been so long identified with this wide-awake company, the names of Hon. Levi M. Bates, of Bates, Reed & Cooley; Lewis May, banker; Rowland N. Hazard, President American Loan and Trust Company; Senator John J. Kiernan, and Henry C. Adams, New York agent Holmes, Booth & Haydens. The company is securing a splendid business in the field of electric lighting, and is well organized and equipped for pushing its increasing business. The new 6 per cent. twenty-year debenture bonds of this company are attracting the attention of investors, and are being marketed in New York by Messrs. A. S. Hatch & Co.

In its recent decision on the telephone law, the Supreme Court of Indiana questioned the justice of the act, but, nevertheless, decided it was constitutional. It would seem, therefore, that justice is not constitutional in Indiana.

There is not that harmony among the attorneys engaged to represent the Government in the telephone suit that there should be, if all reports from Washington are true. Ex-Senator Thurman has returned to Columbus, and matters are moving very slowly.

The Brown Automatic Converter which we illustrate and describe on page 9, was exhibited in the rooms of President Morrison at the National Electric Light Convention in Baltimore, where its excellent work was much noted and favorably commented upon.

A fire in an eastern city caught from a carbon dropping from an electric light. The loss will be about $13,000.—*Daily Paper.*

At the Electric Light Convention, Mr. Woodbury specified among the few essentials for safety in electric lighting "some extra stop at the bottom of the lamp to prevent the carbon from falling in any contingency."

The New York and New Jersey Telephone Company have closed a contract with Col. D. H. Dorsett, of Chicago, for the construction of the Dorsett conduit system for the use of the telephone and telegraph companies in the city of Brooklyn. This contract meets with the approval of the Brooklyn Subway Commission. The commissioners of our sister city are evidently alive to the work before them, and have secured an underground system that has stood the test in Chicago and other Western cities. The New York Subway Commission has not as yet made any report, but will probably be heard from officially within the next ten days. This endorsement is probably due to the fact that the Dorsett system is an inclusive underground subway, that has stood the practical test of time successfully.

On Saturday last we learn that the Essick Printer, exploited by the National Printing Telegraph Company, was exhibited at 145 Broadway. The electricians and electrical engineers of the daily press were present and examined it electrically. It is said that one of the principal features of this instrument as explained by the inventor was that it worked faster on a long line than on a short one. The reason he gave for this was that the length of the line balanced the battery in some way—exactly how is of course his secret. As it has a lettered key-board it was claimed that any person could work it without experience. The commutator and receiving instruments both have some marked peculiarities in the inventor's estimation, and he claims an average speed of forty words a minute, yet at his exhibition he scarcely obtained a speed of fifteen, which to use his explanation may be accounted for from the fact that it was on a short line.

We have received from Mr. I. H. Farnham, electrician of the New England Telephone and Telegraph Company, several photographs showing the condition of the telephone and other wires in the city of Portland after the heavy sleet storm a few weeks ago had brought so much disaster. The photographs, however, striking as they are, do not give a clear idea of the great damage caused to trees and wires. The company had fifty men at work for three weeks restoring the wires. In many places clear, blue ice, two inches in diameter was formed upon the lines; small wires loaded as badly as larger ones and having less margin of strength, broke more frequently. The electric-light wires, particularly the smaller incandescent ones, suffered considerably and trees were badly broken in all parts of the city. The experience was a rough one, and the people of Portland are not desirous of any more sleet storms.

ARTISAN INVENTORS.

The amount of unpatented invention in every great mechanical system has been sufficient to metamorphose failure into success, but not recorded in any manner which brings the just reward to the deserving. Consider our railway system with a complexity of organization, which is rendered possible only by the method which reaches to every detail.

Faithful clerks each add their contribution to methods of accounts; an intelligent conductor, in considering the difficulties experienced by passengers in changing from one line to another, suggested the coupon ticket to his superintendent, and that officer also perceiving therein a method of making alliances with other lines, carried the proposition into effect.

The inventions which led to the locomotive were only the nucleus of the railway system, which is the result of inventions of method and device on the part of humble men, who merely considered that they were performing a duty for which their wages were full requital.

The railway system is a history whose evolutions may not have been so fully emblazoned as that of the march of armies, and pomp of ceremonial; but the results of this work form one of the bulwarks of civilization, for the facility with which markets and supplies reach each other is accomplishing a uniformity in the distribution of the comforts of life and the means of obtaining them.

There are other matters around us, also forming a group of history over which the student of the future will ponder, as one of the conquests of peace; and we refer to the general use of electricity in every department of life. It would be trite to recall in detail its numerous applications, but the point to be considered is that the universality of its application is not possible by reason of the direct personal inventions of any of the originators of telegraph, telephone, or electric light systems. What a short chapter the history of the telegraph would be, if a sub-contractor had not directed the underground wires of Prof. Morse to be fastened to posts where they could not bury them.

Admitting that Morse had brains enough to insulate underground wires, and could raise money enough to pay for them, would his telegraph system have been a success? Undoubtedly not; for his apparatus was unequal to the task, and the state of the art at the time would have imparted no clue to solve the difficulty.

If it had not not been for the invention of ærial wires, as a necessity, by some humble worker, unknown to fame, the first telegraph would not have worked, and the reverential "What hath God wrought!" would have degenerated into "What the d—— is the matter!"

It is no disparagement to the inventive genius of Prof. Bell to inquire what would have been the measure of importance of his invention, had it not been reinforced by the inventive skill of those engaged in the practical manufacture, assembling and adjusting the instruments; the central station and its switch-boards; the wire used and the method of its installation over our cities. That one invention quickened thousands of active minds to co-operative work.

In a less marked degree, perhaps, the steady illumination of the later electric lights bear witness to the finishing touches which have originated with those employed in the practical operation of electric lighting plants. Meeting difficulties, and they were as legion, the methods, alterations and devices, invented to meet the necessities of the case, have been engrafted upon the system to which they were first applied,

It is no premium on ignorance that such results have been the work of unpretentious hands, but the result of the severe application of intelligent minds applied upon the one object with a most persistent concentration.

The Manhattan Electric Company, New York, has been organized with a capital stock of $250,000. William G. Spiegel and others, incorporators.

GENERAL WESTERN NEWS.

Mention has been made in these columns of the earnest and deep interest which pervades all the telephonic articles of a Chicago daily since the ordering of the investigation. Wading through one of these articles, one is astonished at the few grains of truth and justice contained in a labored and carefully-worded column. The reader is led to believe things which are hinted at in such form as, without careful scanning, appear like direct and positive statements of well-known facts.

We have also among us another journal, which on any and all occasions only requires to know the side espoused by its competitor to at once run up the flag of the opposition, and advocate anybody's claim for that or some other "squibalent" reason. Each of these journals is quite like the Irish emigrant, who, upon landing, was asked whether he was a Republican or a Democrat. "Who has the government?" queried Patrick. "The Republicans." "Then," said he, "Oime a Dimmycrat—for I'm always forninst the government."

So these two journals have taken opposite sides of the telephone question, and there is likely to be some pretty close sparring before the row is over.

A few days since a daring forger was arrested at the Mechanics Bank in St. Louis, where he had presented for payment a check for $1,180, purporting to have been signed by D. G. H. Smith, local treasurer of the Missouri Pacific road. The telephone proved his villainy, and the bold, bad man was taken into custody. Papers found upon him proved that he was one of an organized gang, for which there are anxious inquirers at York, Pa., Watertown, N. Y., and Detroit, Mich.

There was trouble among the stockholders of the Inter-State Telephone Company a short time since, as here chronicled, and the legal fraternity was appealed to for help. Mr Joseph Reynolds, better known here as "Diamond Jo," sued certain parties of whom he had purchased stock in the hyphenated corporation. The suit has been withdrawn, and Mr. Reynolds has blossomed out into a full-fledged promoter of, instead of a hindrance to, the active organization and prosecution of the company's projects.

One reason for this happy *finale* to the litigation and bad blood, which was rapidly working itself up to fever heat, is said by a daily here to be found in the fact "that the Hon. J. Kirkner, after the most careful and complete investigation of the company's standing, both in a financial and legal status, subscribed for $50,000 worth of the stock, paying for the same in cash."

What a piece of carelessness on the part of the reporter, who forgot to tell us how much was paid per share, or even how many shares went for a dollar.

Singularly in contrast with the above item comes the statement from Evansville, Ind., of an employe of the electric light company, who short-circuited a dynamo carelessly, and paid the penalty with his life for his unfortunate heedlessness. But the current from a dynamo is more potent than that from the telephone coil at short range.

And, besides all that, Mr. A. C. Knapp, who was formerly an Inter-State man at Chicago, now of St. Paul, denies the settlement above mentioned, and claims that Messrs. Whitlock, Luton and Gault, directors and stock sellers, are answerable to him for $24,500, for which he has filed a bill, and an injunction to prevent them from disposing of any stock in said company.

In Hannibal, Mo., the city council the other night repealed the ordinance under which the M. and K. Company ran wires. It is claimed that there is a contract in existence which allows the company to charge $3 per month for each instrument when the list of subscribers numbered one hundred. Despite this provision, the company has been charging $4 per month. The council made the demand some time since that the rate be

reduced. The company would not do this, and the action of the council is the outcome of the trouble.

The Revenue Commission in this State has been arranging several changes in the State code relative to taxes. Among others, a tax of $2 each on telephones used, and 75 cents per mile on telegraph wire. Much of the present machinery is to be done away with; the board of equalization is to be wiped out; and the county assessor, who is to be elected to serve four years, with his deputies will do the work which has heretofore devolved upon the township assessors. Assessments are to be made on the first of the year.

On the 27th ult. the Metropolitan Electric Light Company, at Chicago, was licensed by the Secretary of State. Capital stock, $65,000. Incorporators, Joseph Powell, Henry S. Stoddard and John S. McClure.

On Monday, the 1st instant, the telegraph lines and all other appurtenances of the Postal Telegraph and Cable Company within the State of Illinois were sold at public auction by Henry W. Bishop, Master in Chancery, at the Adams street entrance of the Government Building, in pursuance of an order of the U. S. Circuit Court, to satisfy a judgment against the company in favor of Eugene N. Howell, of New York, the amount of which was $61,266. Mr. Howell's attorney, Mr. James L. High, tendered the one and only bid, and became the purchaser for $25,000. The sale was made subject to a prior lien held by the Farmer's Loan and Trust Company, for $10,000,000. The vendue was a very close communion affair. Aside from the auctioneer and the purchaser only one individual, Mr. E. A. Kent, who represented the company, and who had come from New York expressly for the purpose, was present.

The Western Electric Company, in a quiet unostentatious way, is worming along into public favor quite generally. Among late plants which have been installed by this company outside of Chicago, are the following:

Bucyrus Electric Light Company, at Bucyrus, Ohio, 75 arc lights; Sandusky (Ohio) Electric Light Company, 50; Painesville (Ohio) Electric Light Company, 50; Du Pere, Wisconsin, Green Bay and St. Howard Electric Light Company, 25; Osceola Stamp Mills, Osceola, Mich., 25; Electric Light Company, Galion, Ohio, 25; Economy Steam Heat Company, St. Paul, Minn., 75; Electric Light Company, Lancaster, Ohio, 25; Plano Steel Works, Plano, Ills., 10.

Two plants of 50 lights each in Chicago, which have not been mentioned heretofore, and a central plant of some 50 to 75 more lights, when added to the above, show the progress of the Western Electric's successes.

In their multiple switch board department the managers are crying for mercy and a surcease of orders until they can catch up.

An insurance man tells a story of telephone experience in Detroit, which has both a serious and a comical aspect. The Burnham wire works at Detroit took fire, and the watchman on duty rang up the telephone lady, who, as in this case, made and provided, asked "what number do you want?"

Watchman.—"Give me the fire department, quick!"

Telephone Lady.—"What number do you want?"

Watchman.—"Oh! blank the blank number; give me the fire department. We are all afire. Blank, blank, blank, quick!"

Then, having notified the fire worshipers of the condition of things, he rang up again, and asked for the house of one of the principals—the receiver, perhaps—and was informed by the telephone lady that: "The service at the Burnham Wire Works had been discontinued on account of profane language having been used."

Which brings up another case of conscience. This time in telegraphy.

Some years ago when one who is not now in that branch of electricity was superintendent of the N. W. Telegraph Company there was a considerable flurry in wheat one morning, and A. telegraphed to B. to buy—one of these sections of the alphabet being located at Milwaukee, the other up the road somewhere. Wheat flopped suddenly, and B. replied:

"Buy be damned! Sell all you can."

"The operator refused to send the obnoxious word—the correspondent refused to change the message—the manager was powerless. Finally the superintendent was called up, who, after hearing the case stated between sobs, remarked in the most soothing manner in the world:

"I think I would send it if I were you, my child. Blank it, it isn't your swear, you know." The message went.

One more swear story. A certain customer of a telephone company always denied the use of profanity when accused, and the operator who answered on his wire set up a job on him. One day when the chief operator, the superintendent and the manager all happened to be in the operating room at the same time, the wicked man rang up. The operator notified the chief and there were four telephones let in upon the line.

By and by the wicked man's evil genius got the start of him and he fired a volley of oaths at his correspondent. Then:

Lady Operator.—"Please don't use profane language."

Wicked Man.—"I didn't."

L. O.—"Oh! but you did."

Chief Operator.—"You certainly did."

Superintendent.—"To be sure you did."

Manager.—"Of course you did."

Wicked Man.—"Well, if four of you heard it, I s'pose it must be so. Give me your number girlie and I'll send you a perfumery case in the morning." She never heard him swear again.

The Central Union Telephone people have had another decision based on that of Judge Niblack, two weeks ago.

The upshot of the telephone business is Indiana is foreshadowed in the following circular:

CENTRAL UNION TELEPHONE COMPANY.

CHICAGO, March 2d, 1886.

To our Patrons in Indiana:

This company announces with regret that in view of the recent decision of the Supreme Court of Indiana, sustaining the validity of the law regulating telephone rentals and toll line charges, it has voted to decline all new business in the larger cities, where it is impossible to furnish service under the law without loss; to forthwith give notice of the termination, at the earliest possible date, of the contracts of all subscribers in such places; to make the continuance of exchange business in smaller places dependent upon the possibility of continuing under the law without loss, and appeal to the Supreme Court of the United States.

This conclusion has been reached after a careful and thorough revision of the estimates which were submitted to the Committee of the Senate and the Governor of the State, and upon which the oaths of its officers in pending litigation were based, showing that the company could not profitably carry on its business under the present law. Much time has been spent in an effort to devise some plan by which all of its exchanges and toll-lines could be continued, but to no purpose.

In conclusion, the company desires to express to all of its subscribers its thanks for their patronage, and especially to the majority who have felt, in common with its officers, the inexpediency and injustice of the law.

By order of the Board of Directors.

W. S. CHAPMAN,
Secretary.

A second one, which is given below, has been served upon about 500 subscribers in Indianapolis, whose contracts will expire on the 31st instant. Whether other cities will be included in this sort of isolation remains to be seen, but it certainly looks as if the wise men of Indiana had bitten off more than they could swallow, and it is ten to one that by the time the next legislature is convened, there will be no lack of advocates of repeal or reform in the telephone law.

CENTRAL UNION TELEPHONE COMPANY.

CHICAGO, ———

M ... .

You are hereby respectfully notified that the Central Union Telephone Company elects to terminate your contract for telephonic service with its exchange at ———, on ———, in accordance with the provisions of said contract.

The company will remove the instruments as soon after the termination of said contract as possible, and pending such removal, no charge will be made for their use in connection with exchange service.

....
Secretary."

The company purposes continuing its private lines, as that branch of business is not interfered with by the law, being within proper limits. Toll stations have been ordered closed at Harrisburg, Fayette Co.; Jonesville, Bartholomew Co.; Bellville, Hendricks Co.; Dayton, Tippecanoe Co.; Montgomery, Tippecanoe Co.; Atchison, Benton Co.; Little Ridge, Grant Co.; Mier, Grant Co.; Roseberg, Grant Co.; Section, Huntington Co; Arlington, Rush Co.

The Cincinnati Company has notified its subscribers in Aurora, Lawrenceburg, and some other points in the southern part of the State that service will be suspended at the expiration of contracts. The same is true of the Evansville Company, and possibly of the Louisville Company, which reaches over into Floyd, Clarke and Harrison Counties.

S. G. Lynch, 144 La Salle street, gives he following quotations as telephone stock values:

Chicago	$375 @	$400
Central Union	51 @	53
Michigan	65 @	68
Iowa Union	14 @	17
Great Southern	25 @	29
Colorado	19 @	22
Rocky Mountain Bell	39 @	44
Missouri & Kansas	53 @	55
Missouri & Kansas, Script, 52 cents on the dollar.		
United	15 @	17
Cumberland	70 @	74
Wisconsin	110 @	112

CHICAGO, March 8, 1886.

BOSTON ELECTRICAL NEWS.

The Sun Electric Light Company, Woburn, Mass., have orders for a large number of plants on their multiple series system: A 150 16 candle-power plant for the Great Western Fire Clay Company, Toronto, Jefferson County, Ohio. The circuit is four to five miles in length. This installation is preliminary to the building of lines, etc., for a large installation. At Exeter, N. H., Frenyear & Razee will supply light from a 100-light plant to the skating rink, depot, and stores. Work has already been begun at Woburn preparatory to a 400-light plant to be operated on a No. 7 wire.

The same system will be run from a central station at Cambridge, Mass., where a 2,000 light plant will be in operation in a few months.

Thompson-Houston Electric Company have begun the work of excavating for the foundation of the addition to their factory. A long block of twelve tenement houses is being moved to give space for the enlargement

The Consolidated Electric Light Company have an order for 150 candle-power incandescent lights for the Naugatuck Rubber Shoe Company factory, Naugatuck, Conn. The plant will be increased to 1,000 lights later in the season. The company have at present in their factory sufficient spare power for driving the dynamos, which will be of the Thompson self-regulating type. The consolidated company have also an order for a 75-light for A. S. Hammond's dry goods store, Concord, N. H. The motive power is to be a Steven's automatic engine, built at Concord, N. H.

The "Sears" building, corner Washington and Court streets, is to be lighted by the incandescent light. The building is at present wired and an engine is in position to furnish power for running the plant.

The Ball Electric Light Company have on order a 40-light arc machine for Providence, R. I.

Mr. E. M. Bryant, the builder of the first telephone exchange, and formerly manager of Manchester, N. H., exchange has just completed the equipment of the Boston and Maine railroad, with the Judkins railroad train signal. Mr. Bryant is now the electrician of the Judkin's Railroad Signal Company.

The Chemical Electric Light and Power Company by the middle of this month expect to be in their new factory and salesrooms 109 Court street. There will be a dark room where lamps of different styles and capacity can be shown at all times.

The question whether incandescent lamps can be run by the current furnished by plating machines has been so often asked that it seems that a solution of the problem would be of interest. The electrical pressure of E.M.F. in plating dynamos is about 5 volts, usually less. The lowest resistance lamps made to-day require an E.M.F. of 20 to 30 volts a number of times greater than that given by plating machines, and not enough current would go through the filiment of the lamps to heat them to redness. There are ways to solve the difficulty; lamps of one ohm's or less resistance, or a continuance to convert currents of low E.M.F. into currents of high E.M.F. the latter arrangement would be expensive as regards the mechanism to change the current and would no doubt be in some degree unsatisfactory in its action, for the problem of using low electrical pressure in a circuit of high E.M.F. is harder than the converse. Lamps of very low resistance would no doubt have a high efficiency. If the E. M. F. of the dynamo be 5 volts, and the resistance of the lamp ½ ohm, then by Ohm's law

$$C=\frac{E}{R}$$

the current or number of amperes flowing through the lamp would be 10. The energy consumed in the lamp would be 5 volts × 10 amperes = 50 volt-amperes also called watts. With an expenditure of volt-amperes per candle-power, we should obtain 16 candles of light.

There has been an exhibition during the past week of the Mack Elevated Railway. The model car and section of track shows the good points in the system. The weight of the car rests almost entirely on a central rail. Two small wheels on each side of a truck run on a base a little below the level of the floor of the car. The system is well adapted to electrical methods of propulsion as there is little difficulty in insulating the central rail from the rest of the iron work.

The committee on street railways of the Legislature have held a hearing in relation to the petition or John A. Enos and others for authority to build a system of elevated railroads in the town of Winthrop and between Lynn and Nahant. The advantages of electric propulsion as shown by the success of the road in Baltimore, were explained by Mr. A. L. Upton, of the Jarvis engineering Company. There was no opposition to the petition.

The town of Hornellsville, N. Y., is strongly Democratic. At the regular election held March 2, the Democrats were in sympathy with the gas interests, the owners of the gas works being prominently identified with the management of that party. In addition to the election of village officers the questions of the introduction of electric lights and an electrical fire alarm were voted upon. The entire Republican ticket with only one exception was elected, and the vote on electric lights and fire alarm was:

For electric light	1250
Against	104
For fire alarms	555
Against	110

The votes were for or against appropriations for introduction of these improvements.

BOSTON, MASS., March 10.

Telephonic News

⁂ The Fire and Gas Committee of Toronto, Canada, have accepted Mr. Hugh Nelson's offer to put in ten telephones in the fire stations at $430 per annum, or $43 per telephone.

⁂ In the case of Edward E. Pratt *vs.* the American Bell Telephone Company, the full bench has decided that the plaintiff, as holder of the convertible notes of the defendant corporation, had no right to share on equitable terms in the benefit of the issue by defendant of the additional shares of stock.

⁂ San Francisco is discussing the underground problem. At a recent meeting of the council committee the petition of the San Francisco Conduit Company for permission to lay wires in the streets was laid over for one week, in order to enable the representatives of the electric lighting telegraph, and telephone companies to be present.

⁂ Mr. S. M. Cortright, General Solicitor of the Pennsylvania Telephone Company, Mauch Chunk, Pa., received for his company fifty-seven new telephone orders during the last five weeks. Friday afternoon of last week, Mr. Cortright surprised the people of Bangor by securing in their town alone, eighteen new subscribers. This is good work by an excellent telephone man.

⁂ The Central Union Telephone Company has issued a notice to its patrons in Indiana to the effect that owing to the recent decision of the Supreme Court of Indiana they are compelled to decline all new business in large cities, and to close out contracts with subscribers in those places at the earliest possible moment, being unable to continue business without loss. They will appeal to the United States Supreme Court.

⁂ The directors of the Central Union Telephone Company will meet this week, in Chicago, and decide whether to close the Indianapolis Exchange or to continue business. This week rebates will be paid for overcharges during the past months. The Ohio Valley Telephone Company, operating in Floyd and Clark counties, will evade the new law by abolishing exchanges in Indiana and making connection for Indiana patrons at Louisville.

⁂ A new telephone wonder, controlled by Count Eugene Mitkiewicz, is reported from Washington. It is known as the "Turnbull." Following is a brief description of it: "The diaphragm of the transmitter is a thin sheet of wood. Inside are suspended six cylindrical pieces of carbon, the lower ends resting on a carbon bar, through which the current passes. The jarring of the carbon pendants caused by the vibrations of the wooden diaphragm make the breaks in the circuit."

⁂ The employes of the Worcester Division of the New England Telegraph and Telephone Company presented Mr. Paul W. Bossart, the retiring Superintendent, with an elegant diamond scarf pin. Mr. Bossart received a letter from the general manager of the company accepting his resignation. The letter says that the acceptance had been held back in the hope that he might recall the resignation, speaks in an appreciative manner of his services as an officer of the company, and adds that Mr. Edison's gain is to the company a serious loss.

⁂ An effort is being made to establish a telephone line between Barnesville and Somerton, a distance of eight miles. It would be a great convenience to hundreds of persons in both towns, and the cost would be small—not exceeding one hundred dollars. It could be operated without any expense whatever. We hope the public-spirited citizens of Somerton will take hold of this matter, and thus place themselves not only in connection with Barnesville, but, by means of the two telegraph lines, with the entire world.—*Barnesville, (Ohio) Enterprise.*

⁂ The funeral of Allie, five years old, daughter of Mr. and Mrs. T. B. Doolittle, who died on Thursday, of diphtheria, occurred yesterday. The little one was the youngest of five children, and her death was a sad blow to the parents. Mr. Doolittle received numerous letters of sympathy and condolence from his business friends in New York, and from the same source came floral designs of the most elaborate description and choicest blossoms. One piece was an elaborate star, which reached here in perfect condition and was certainly one of the most beautiful specimens of workmanship of this kind ever seen here.—*Bridgeport (Conn.) Farmer.*

⁂ The Western Electric Company sent to the stockholders and friends of the company a notice of the death of Mr. W. S. Smoot, signed by Mr. E M. Barton, vice-president, and J. M Jackson, secretary. After mentioning his illness and briefly alluding to his honorable career, the concluding words are as follows: "A little over a year ago, upon the resignation of Gen. Anson Stager, he was elected president of this company, and since that time every part of our business has felt the beneficial effects of his strong good sense, his energy, and his high regard for the right. His manners were most genial, and his loss will be greatly felt by a wide circle of friends and acquaintances."

⁂ Speaker Carlisle has appointed the special committee which will have charge of the telephone inquiry. The committee is made up as follows: Its chairman is Boyle, of Pennsylvania, who is a good lawyer. All of the members of the committee are lawyers. There are five Democrats on the committee and four Republicans The head of the minority is Mr. Ranney, of Boston, one of the leading lawyers of that city. The Democratic members are Boyle, of Pennsylvania; Oates, of Alabama; Eden, of Illinois; Hale, of Missouri, and Hall, of Iowa. The Republican members are Ranney, of Massachusetts; Millard, of New York; Hanback, of Kansas, and Moffat, of Michigan. Three members of the committee—Oates, Eden and Ranney—are members of the present judiciary committee of the House.

⁂ The telephone is a puzzling mystery to the rural mind that tackles it for the first time. For instance, a countryman approached a telephone man in Boston the other day with the following interrogations: "Now, mister, what makes the thing work? Thar's yer wire and thar's that 'er trumpet and all that, but ain't thar suthin' aside o' that? Whar's the steam, the *push* to the thing? What makes the talk go 'long so? *What greases the derned thing?*" The Boston *Record* tells of another rustic who was attracted by a telephone man's apparent carelessness (in putting up a wire) about twisting it around the knob. There was a worried expression in his countenance, and soon, with evident disgust at the work of the telephone man, he turned away and walked toward his companions. With a knowing look in his eyes, and with an ominous shake of his head, he called out to them in drawling tones: "Wa-al, I don't kno ow but they'er goin' to git it to talk 'round all them 'ere twists, but I'll tell yew wha-ut, *if they dew it's a goin' to sound kind o' stuttery!*"

⁂ In mentioning the telephone interests of its city, the St. Joseph, Mo., *Gazette* contains the following: "There is no city on the river that has more efficient telephone service than St. Joseph Since Mr. W. M. Yenawine assumed the management of the Exchange last April, the increase has been 111 telephones, and the total number now in use in St. Joseph is 400. During the past six months lines have been built to Troy and Savannah, and a fifty-wire cable has been strung, with another one containing one hundred wires in the course of erection. The toll business between St. Joseph and outside points is more than three times as large as it was a year ago. There are now eight switch-boards in the office and five operators. The increase in St. Joseph shows a better average than that of any city on the entire circuit. St. Joseph never had better service than at present, and the work of the year speaks highly for Mr. Yenawine."

⁂ The new Pan-Electric telephone "toll-collector," now in use in St. Louis, is described as a simple arrangement, under the control of the central operator, whereby any one may connect with whatever number they want in the circuit, by first slipping a nickel into the telephone they may be talking through. In the event of failure to make the desired connection, pressure on a small plug, with the announcement that you want your money back, instantly brings the nickel out of the telephone in plainer view on a little metal tray. If the customer gets what he paid for—that is a connection with another telephone, his nickel drops down into an iron cash-box the instant he returns the receiver to its place. Until that act, however, the money is held under control of the Exchange operator. This apparatus also insures the use of the wire as long as wanted without the possibility of being cut off or interrupted by others using the line. For instance, 300 wishes to communicate with 150; the nickel is first deposited by 300, then the taking down of the receiver originates a current that reports its number at the Exchange, making it necessary for the customer to only announce the number he wants. The only ringing is a delicate tingle of the bell at the remote end of the line from which the call is made. Dr. Wellington Adams, the company's manager, who invented this system of collecting telephone tolls by electricity, has so perfected the plan that either of the current-size nickels will operate to perfection, whether they be new or old, clean or dirty, while at the same time a penny, a 2 or 3-cent coin, will not do the work. The weight and size of the nickel held in a certain position by the telephone is essential to a connection.

⁂ Mr. J. E. Hudson, general manager of the American Bell Telephone Company, and General E. Sherwin of the New England Telephone and Telegraph Company, were seen recently at the office of the first-named company. In answer to a query regarding the significance of the law recently passed in Indiana, restricting the rates of telephone rental to $3 per month, and confirmed by the Supreme Court of that State, it was agreed by those gentlemen that nothing could be said as yet regarding the probable action of the Indianapolis company in the matter, its future course being now under consideration. It is quite probable, however, that an appeal from the State Superior Court will be taken up to the Superior Court of the United States at Washington. The chief point urged by the telephone company in objection to the law, which objection will doubtless be shared by all similar companies, is that the sum of $36 per annum is insufficient for the bare expense of putting in and maintaining a telephone. Especially in the case of an exchange of the size of that at Indianapolis, with 1,000 subscribers, the actual cost is considerably more than that sum, and in the case of exchanges in small cities, town and villages, the expense greatly exceeds that sum. "An impression prevails in the popular mind," said General Sherwin, "that the business of telephone companies is remarkably remunerative. This impression doubtless arose from the inexperience of the companies in the early days of the business. It has been found by experience that a telephone plant deteriorates 10 per cent. in a year. The entire plant requires renewal, therefore, every ten years. The wires last only half that time. At the expiration of five years, wires are so completely eaten through with rust as to leave a bare thread of metal remaining. Then all the apparatus requires comparatively frequent renewal, both on account of natural wear and tear, improvements in switch boards and other apparatus, and extraordinary casualties, such as sleet and thunder storms. A sleet storm is most dreaded by us, because of the large breakage of wires which ensues on account of loading with ice. A sleet storm means the loss of several thousand dollars to our company alone. The last one cost us $15,000 in renewal of wires alone. In a large exchange like that of Boston the average cost of maintaining a single instrument is much more than the sum fixed by the Indiana law. It is probable that the law was not thoroughly considered and all the facts ascertained before its passage. The legal aspects of the passage of such a law are interesting, and doubtless many would like to obtain the passage of a similar law regulating the price of flour or house rent. It is difficult to predict what course the Indianapolis company will take. Even if the law should be repealed it cannot be done for a year, and action of the Supreme Court at Washington would doubtless be even slower. The law is equally unfortunate for the company and for its subscribers."—*Boston Post*

The Man Who Started the Pan Electric Telephone Scheme.

WASHINGTON, March 8.—The Pan Electric Telephone people are central figures here just now. There is every prospect for a demand for an investigation of the whole matter, by which the company was formed and its stock distributed among Congressmen and others, who then used the machinery of the government to get advantages for the company. Rogers, who invented the telephone, was formerly electrician of the House, having charge of the lighting apparatus and what little electric apparatus there is in connection with the machinery of that end of the Capitol building. The House is lighted mostly by a network of gas pipes and jets above the stained ceiling of the Hall. They are ignited by electricity, and the person who has charge of them, who sees that they are burning properly and are kept in order, and who goes about in the halls and corridors of the Capitol turning on the gas and lighting it with a wax taper, is called by courtesy the "electrician" of the House, simply because some of the lights are lighted by electricity. By right he ought to be called the lamplighter, but that would not sound so large, and so he is called the "electrician." That was the position which Rogers held when he offered the Pan Electric Telephone to the "tenderfoots" of the House and Senate. Your correspondent met some time ago an old and thorough electrician, who has seen every stage of the telegraph and telephone, and asked him if he knew anything about the Pan Electric.

"I know all about it," he said. "Set down the figures 745. Now multiply that by 12. Now divide the product by 10. Now multiply it by 6 again. Now add 84. Now subtract 5448 from it, and what have you left?"

"Nothing."

"Exactly. Well that is just what the Pan Electric Telephone Company amounts to. It was gotten up by this cranky fellow Rogers, and was a cheap imitation of others. He went through the form of calling himself a company, issued stock, and gave away millions of dollars' worth of the imaginary stuff, entirely worthless, as I have always believed and still believe; gave it to whoever in official circles would accept, with the idea that their names and influence would help him to get something out of it. The brighter men of the House, such as Sam Cox and Abe Hewitt, and lots of others, refused the stuff." So much for Rogers, the inventor. It is very wrong to say of anybody that he is a crank, and far be it from the author of this correspondence to say that Rogers is one.

Attorney-General Garland, who is most prominent in the list of "victims," is well known to everybody. His smoothly-shaven face, prominent nose touched with red at the end, slouch hat, and usually somewhat soiled linen point him out to everybody. Senator Harris is a pretty well known figure here. He seems to be about as much interested in the matter as Garland, even more in some particulars. He is a little, sharp-featured man, with a fringe of white hair around his bald head, and a flowing white moustache. He is a careful man in a business way, and has accumulated some money during his career in Congress, living in a quiet way at a boarding house near the Capitol.

The German and the Telephone.

The monkey barber, as the German barber always calls his playful young assistant, was in charge of the shop, when the reporter of the New York *Sun* dropped in for his Saturday shave. The young man endeavored to entertain his customer handsomely, and with much talking.

"I see der Yankees have der Chermans fooled, alretty, mit der delephone, aint it?" the young man asked. "Vot! didn't you reat it py der bapers? Vhy, der scientists uf Chermany haf peen der delephone discussing for a gupple years yet. Yah, dem haf shplit into two schools apowd it—von peing uf der obinion dot der American machine vould be proken uf Cherman was shpoken into it; der oder school glaiming it vould not smash, but dot Cherman could not pe understood along it. Der lasd school vos headed py a Heidelpergh brofessor, vich vos in Nye Yorick a gubble years ago, und dried to speak mit a delephone in a hotel. It habbened an Irishman vos py der oder end, alretty.

"'Psit! Landsman,' der brofessor sayt; 'ich bin Professor Stinkelwitz von Heidelberg ——'

"'Take that gutta-persha tube out av your mouth and put it to your ear,' vos der rebly vot he got

"'Ich bin Professor Stinkelwitz von Heidelberg; verstehen sie nicht?'

"'Cintral, tackle the puzzle an' see can yez make out fwhat ails it,' der Irishman galled owd.

"Der brofessor negst in Cherman asked an American friend to ask der Irishmans uf he undershtood vot he hat choost peen saying, yet.

"'Fwhat,' vos der rebly; 'was it the gintleman that was afther thrying to ate the box? Divil a wurrud could I undershtand.'

"Berfectly satisfied, der brofessor vent to Chermany pack, alretty, und founded a school uf science, holding dot a dotally new machine vos needed, vhile der resd der elegtricle sharps pelieved dot der Yankee machine choost merely needed sdrengthening und Chermanizing py peing soaked in sauerkrout or lager peer. It vos in such a sdate uf affairs like dot der Yankee sbeculators a batent dook out fer der recklar Yankee delephone, und are now making der olt gundry like a beckyard on vosh day, mit so many delephone vires und boles."

Messenger Boys As Detectives.

In response to an inquiry made by Superintendent Frost, of the American District Telegraph Company, that gentleman gave a number of striking examples of how important these blue-uniformed lads have become to the big city's daily life. Instances of their work in detecting crime and causing the arrest of criminals were particularly interesting. Messenger David Boyle, while passing through East Fifty-seventh street one day noticed a man come down the steps of one of the residences, tear off a wrapping from a book that he carried and throw the torn paper into an ash-barrel The boy picked up the piece of paper, and seeing the number of the house on it, rang the bell and asked the servant whether a book had not been stolen. A hasty examination showed that such was the case. The boy at once turned and followed the man, and meeting a policeman, caused his arrest. A very valuable tortoise-shell paper cutter, as well as the book, which was a highly-prized one, was found in the thief's possession. The man had entered the house under pretence of selling a mocking bird and taken possession of the articles while the servant had gone to ask her mistress about purchasing the bird.

Another case was that of William Rooney, a messenger boy who aided the police in capturing two noted confidence men. These men sent fraudulent checks through the mails to merchants for more than the amounts due, and had messenger boys call for the remainder and take it to them. Young Rooney was suspicious, and informing a detective, the men were arrested. A case of a messenger boy causing the arrest of a burglar whom the police were after, occurred in the Twenty-ninth precinct. A description of the burglar was given the boy, and he was set upon the lookout. After a long search, he discovered his man, followed him and found part of the stolen goods, and then reported to the police. The burglar was captured and the goods recovered. Another happened to see a thief snatch a watch from the vest of a man in a crowd. The boy shouted, "Stop thief," and running after the man, caught him. He was thrown to the ground. Nothing daunted, however, he picked himself up and ran after the thief, and caught him again. This time he held on until the police arrived. One of the boys who was honorably bulletined in all the offices, was C. Filly. It was in the case of the robbery of a clerk, who was taking a package of several thousand dollars to the West Side Bank. Three men had assaulted the clerk, and had about overcome him, when, seeing Filly, the clerk threw the package to him, and told him to run for his life. The boy did so, but was captured by one of the robbers and told to give up the package. This he refused to do, and in consequence he was knocked on the head, and fell unconcious to the walk.

The Indiana Telephone Decision.

The recent decision of the Indiana Supreme Court upholding the constitutionality of the restrictive law regarding telephone rates, was undoubtedly a surprise to the managers of the companies interested. It is the more peculiar, on account of the character of the case upon which the suit was brought. It appears that a gentleman living some distance from the exchange applied for telephonic connection It was offered to him at the so-called legal rate of three dollars per month, provided he would consent to being placed upon a circuit with other subscribers. He objected to this, preferring to accept the service at $11 per month, for which sum the company agreed to provide him with a special wire. Upon these grounds the suit was based. All who are familiar with the character of a well-organized telephone service will admit that three dollars per month is not sufficient to pay the proper running expenses of such a system, and provide a reasonable profit. Possibly it might sustain an unreliable service, subject to those annoying interruptions which would make it dear at any price. This, however, is apparently unsatisfactory to the Hoosier subscriber. He desires not only to occupy a reserved seat, but a whole private box, on a ticket for general admission. "The telephone," says the learned judge, "has become a public necessity." Possibly it may be in certain locations; it certainly cannot be classed as a luxury.

It is rather a late day to endeavor to introduce the doctrine of universal equality, when even the national government has drawn a sharp line, separating the aristocratic special postage stamp from its plebeian associates and the still more democratic postal card. Through every ramification of our social and business life, and in every class of service performed by common carriers, among which the telephone companies are included by this decision, we find some distinction of this character, by which superior goods or facilities may be obtained at a higher price. Although apparently obnoxious in some cases, these rules are founded on common sense. A merchant ordering his goods by express would have just as legitimate an excuse for bringing suit because a higher rate was charged than would have been the case if they had gone by freight over the same route. The man who pays ten cents to have his boots blacked in a hotel, does not file a protest because the same work is done on the street at a reduction of 50 per cent. It is unnecessary to cite the numerous parallel cases which will occur to the mind of any person giving the slightest attention to the subject. Confining our attention solely to the class of common carriers, it will be readily perceived that it is for the welfare of all; that in certain emergencies the people should be permitted to secure special service.

It is not as yet decided what course the companies interested will pursue. They must eventually relinquish the business, or continue it at a loss in the hope that the decision will be reversed by the federal Courts, as it undoubtedly will be. Although their contracts with the home company may require them to continue business in spite of adverse legislation, some plan will doubtless be discovered by which they can comply with the letter of the agreement without maintaining an extensive system throughout the State. —*The Electrician and Electrical Engineer.*

Information for Boys Anxious on the Subject of Electrical Engineer.

There are two roads to take if you wish to become an electrical engineer. Although this occupation of electrical engineering is so new, there are three colleges in our country where the theoretical part of the profession is taught, namely: The Stevens Institute of Technology, at Hoboken, N. J., the University of Pennsylvania, and the Massachusetts Institute of Technology. There are other schools, but these are the best known. If a young man has gone through the theoretical and partially practical training, to be had in either of these institutions, he does not require a great deal of actual experience in doing the work itself to fit him for undertaking almost any task pertaining to the calling.

But some boys may not be able to spare the time or pay the money for this collegiate part of the training. In that case they endeavor to find employment in one of the factories of the great companies I have mentioned. To obtain admission, however, they must be bright, they must give good promise in the taste they have for mechanical pursuits, as well as in their habits, that they are suited for the profession they seek to enter. Having obtained an entrance, they begin as ordinary employes, doing the simplest kind of work, or even drudgery; then they are transferred from one department to another, learning a little at each step they take, until, finally, they have a good knowledge of the manufacturing branch of the profession.

From there they should go to the laboratory, where they obtain the scientific knowledge of the business To know how the different parts are put together is not of itself sufficient; they must be able to tell why they are put together in that particular way; it is just that knowledge which makes them electrical engineers.

Then they are sent out as assistants to the various electric lighting stations, or they are temporarily placed in charge of plants which have just been established and which some amateur engineer is learning how to run. Finally they may be put in charge of a lighting station—that is, a building from which the lighting power is furnished for the lamps in the immediate neighborhood; and lastly they may become members of the engineering corps, and put up the electric lights for people in the manner I have described.—*St. Nicholas.*

.....A recently-married electrician, who lives near Sacramento, Cal., has devised a scheme for protecting his wife from the annoyance of tramps The vagrants invariably sought the kitchen via a rear stairway, so the electrician detached the four bottom steps from the others and attached a powerful battery to them. A wire from the battery runs into the kitchen, and when a tramp is seen approaching all that is necessary is to touch a spring at the proper moment, and the astonished seeker after provender is thrown nearly over the back fence.

.....Commissioner of Patents Montgomery appeared before the House committee on patents recently to explain the necessity for the changes suggested in his annual report in the patent laws in regard to the date a patent should bear, limitation of patents, assignments and repayment of fees. The commissioner dwelt at length upon the necessity for relieving his office from the duty of hearing appeals, and suggested the establishment of a tribunal, to consist of at least three judges, with fixed tenure of office, to which appeals shall be made.

TELEGRAPHIC

..... S. M. Cortright, of Mauch Chunk, Pa., the widely known telephone expert, has just opened a store at that place for the purpose of furnishing electrical supplies in that locality.

.... The Western Union Company at New Orleans have raised their telegraph poles fully twenty-five feet, in order to place their wires out of any interference with the telephone and electric light wires.

.... The Western Union Company has decided to pay the State tax of nearly $150,000, the payment being made under protest, and on a telegram from Mr. Jay Gould who is absent in the West Indies.

.... The Iowa State Senate has passed on second reading Miles' telegraph bill, imposing a penalty for the failure to transmit and deliver messages promptly, and reducing tariff on the same to the rate of twenty five cents for fifteen words between any points in this State.

.... The new magneto bell-ringer of the Detroit Electrical Works will probably be adopted by the Fifth avenue stage line of this city, where it will be an especially convenient and economical signaling system. The demand for this ringer, we are informed, is greatly increasing, and it is certainly an ingenious and useful invention.

.... The first ball of the Boston Telegraphers' Mutual Aid and Literary Association, was held in Boston last week, and was quite a success, The officers of the association are Eugene J. O'Connor, president; Benjamin C. Chase, vice-president; George H. Winston, recording secretary; Matthew C. Harrington, financial secretary; Martin W. McLean, treasurer, and John J. O'Leary, sergeant-at-arms.

.....An illustration of the way some people speculate in stocks was furnished in a broker's office the other day. An eager but inexperienced individual was hanging over the ticker when along came the words on the tape, "Test A B C, 1, 2, 3," The incipient speculator glanced at it and shouted to the broker, "Jim, what's this B. C. that is selling at 123?" The broker winked solemnly at the crowd and said, "its going to four and five I think." The lamb gasped and responded, "Buy me a hundred," and looked up in astonishment at the roar which his order elicited.

..... If the resolution ordering electric lights on the bridge is passed by the Milwaukee council, the Board of Public Works will be instructed to have the railroad companies put similar lights on their bridges. There are twenty-one city bridges and five railroad bridges in the city limits, and if each receives an electric light of 2,000 candle power, the harbor will be light as day all night. Alderman Chase thinks that this will be an inducement to vessel masters to move about at night, which will lessen the swinging of the bridges during the day time and obviate blockades to a large extent. It would likewise be a great advertisement to Milwaukee, he thinks, as no other harbor in the world is now lighted in that manner.

.... The Supreme Court of Missouri has rendered an opinion in the case of the Julia Building Association against the Bell Telephone Company. The case came before the Supreme Court on an appeal from the judgment of the St. Louis Court of Appeals. The Bell Telephone Company, in erecting poles on Sixth street opposite a dry goods store, owned by plaintiff, cut through a stone pavement and removed a portion of the masonry that forms the wall of the building. This the Julia Building Association claimed would result in great injury. The opinion, which is very lengthy, is to the effect that telephone poles are a necessity, and when a company secures from the State and city the right to erect them, citizens owning property adjacent to the street cannot prevent.

The Editorial Scissors.

The opinions of several distinguished editors on the question of the use of the scissors are published below, particularly for the benefit of those parties who do not appreciate the efforts of the exchange editor :

In editing a newspaper a pen is a necessary article; so is a pencil, inasmuch as it may at times be more convenient than a pen to write with. A pair of scissors is also necessary. But what is most necessary is brains. Next to brains in value I estimate what we call the newspaper instinct, the sense of what news the public require and what discussion will be most effective. Next after this come special talents and general knowledge; and the more knowledge, general and special, a newspaper man has, the more useful he will be.

But with all these gifts and graces he won't accomplish much unless he also possesses a sense of humor and an uncompromising love of truth and of the United State Constitution.

A pair of scissors, however, is not as good as a pair of moderate-sized shears, and neither scissors nor shears can make a journalist. C. A. DANA,
Editor New York *Sun*.

I have the most exalted respect for the editorial shears. There is no department of a newspaper so interesting to me as the selected miscellany—provided the scissors-work has been done by a man of genius, It is not difficult to find men who can write, but men who can handle scissors with judgment and taste are scarce. I have worked in every department of journalism, from type-setting to defending libel suits, and I never feel that I am in such a fair way to confer a favor on the human family as when I am sitting in front of a big pile of exchanges with a pair of sharp scissors in my hand and a paste cup at my elbow. Very truly yours,
JOHN A. COCKERILL,
Editor *New York World*.

In the hands of an editor "entirely great," the scissors are as mighty as the pen. Good "exchange readers" are scarcer than good writers, and, although they come high, we must have them in every well-regulated newspaper office. The most successful journals of the day in this country are those which make the best use of the scissors, giving due credit for borrowed matter, whether copied bodily or adapted and however classified. Browsing on the exchanges is a wholesome pastime and a nourishing and stimulating practice for any man in the editorial rooms, from editor-in-chief to office boy.
Very truly yours,
M. P. HANDY,
Editor *Daily News*, Philadelphia.

Let me wield the scissors of a newspaper and I care not who writes its leaders.
J. B. MCCULLAGH,
Editor *Globe-Democrat*, St. Louis.

Electric Lighting and its Prospects.

Editors Electrical Review :

It is generally supposed by those who are unfamiliar with electrical subjects that improvements will soon be made in the theory and application of electricity that will enable us to have heat, light and power at very little expense. In the problems of lighting and the distribution of power there may be losses in the boiler, steam-engine, dynamo, wires and lamps. In steam-engines little improvement has been made for some years in the matter of greater efficiency, though there has been a great advance in close regulation. Dynamos, as now built, have an actual efficiency of more than 80 per cent., and in them little improvement may be expected in the future. The loss of current due to the resistance of the wires can be made as small as desired by using larger conductors, which, however, becomes expensive when long lines are necessary. If the lamps are placed abreast (*i. e.*, in multiple arc), the cost of conductors is a large part of the first cost for plant; if the lamps are in series, the smaller wires used represent a small part of the investment. The difficulties in the way of the accomplishment of the latter method has been a want of elasticity. If the lamps be grouped in multiples of seven, all the seven must be burning or an equivalent resistance thrown in, and it is at least inconvenient not to have the seven lamps in one store. The system that overcomes these disadvantages, and enables one to run the lamps in multiple series without use of resistances, in place of lamps turned out, and with the combination of a suitable meter, will solve the problem of incandescent lighting from a central station.

In one other direction there appears to be room for improvement in the efficiency and life of incandescent lamps. It is evident that with lamps using one-half as much energy as those of the present time would enable present plants to furnish twice as much light for the same price now charged, or light at lower rates and large returns on investment. With the improvements which are being perfected, the electric light, arc and incandescent, will be the illuminant of the future. F. M. G.

Electric Motors in St. Louis.

Mr. John Scullin, president of the Union Depot Railway Company, returned recently from Baltimore, where he had been to see a new electric motor in use there on a line of street cars, with a view of using it in St. Louis. He stated that he was very well pleased with his investigation—unexpectedly so. He found a line of road two miles in length in successful operation, the power being conveyed from a third rail, receiving its charge from a stationary dynamo at the end of the line. The current was conveyed to the motor by a wheel and rod running in the third rail, as in the case of a cable road. Mr. Scullin said the road in Baltimore was the only case in which electricity had been practically applied, and he regarded it as establishing itself as the coming motor. He said he was not an electrician, that he was not prepared to express an expert verdict, but he was ready to see horse and cable means of transportation away in the shade. He made several trips over the line, and found it at all times working very smoothly, just as well on the steepest grades and sharpest curves as on the straightest tracks. On his first trip, at which time the car had sixty to seventy people in it, the superintendent of the road had the car stopped on a very sharp curve on a steep grade. It was brought to a dead halt, and then started up again as easily as if it had been on an ordinary straight and level stretch of track. Mr. Scullin regarded that as one of the most severe tests possible. The track was also as harmless as a horse-car track. Contrary to what obtains in electric wires and other means of conveying electricity, a person could hold the rail in his hand and feel nothing more than a tingling sensation Children could run over the rails in their bare feet and feel no effect whatever.

The cost of the road was also in its favor, being only $7,500 per mile, the Baltimore line costing but $15,000. Mr. Scullin received a proposition to change his Union Depot line to the electric system, to Park avenue, for $10,000. That would be about two miles, counting all of the twists and curves. In that case the blue, white and yellow cars would be taken by the electric motor to Park avenue, where they would be taken by horse-power over the lines to Tower Grove, California avenue and the convent of the Sacred Heart, and Lafayette Park and the Gravois Road. The system will be more carefully investigated, as to durability, strength, etc., by an expert to be employed by Mr. Scullin and others, and if it is reported upon satisfactorily, will probably be introduced in St. Louis at an early day and become one of the features of transportation in this city.

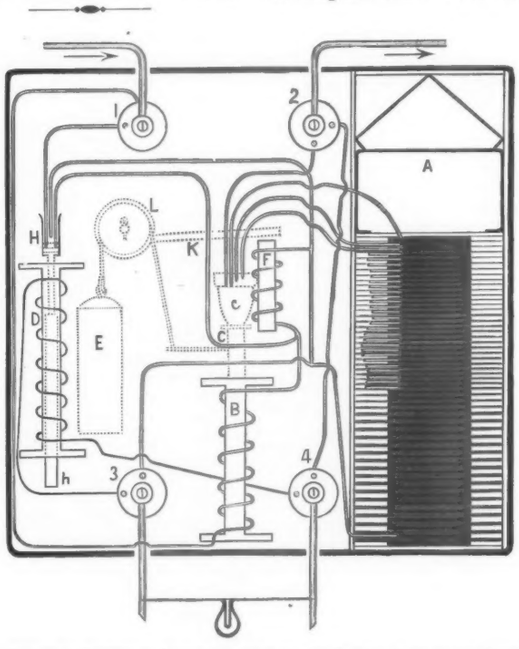

FIG. 2.—SHOWING INTERIOR ARRANGEMENT OF THE BROWN AUTOMATIC CONVERTER.

The Makers of the Clerk Gas Engine in England Submit to a Perpetual Injunction.

The case of Otto *vs.* Sterne (L. Sterne & Co.), which, it was understood, was settled previous to the trial of the action of Otto *vs.* Steel, was called up on the first of February in the High Court of Justice—Chancery Division—before Mr. Justice Pearson.

The attorney for the plaintiff stated that the case had been standing out of the paper pending a settlement, and the parties had now arranged terms. The defendant had agreed to submit to a perpetual injunction, and to pay the costs; plaintiff on his part not pressing for any inquiry as to damages.

The attorney for the defendant agreed to these terms, and the order was made accordingly.

* * The Windsor Hotel, New York, is now beautifully lighted by a 500-light installation, on the Westinghouse system. The vestibules are illuminated by single lamps of 150 candle-power each.

* * The experiment made with the induction telegraph on the Milwaukee & St. Paul railway is reported a fine success. George C. McGregor, Manager of the Railway Telegraph and Telephone Company, supervised the work, which was performed by S. K. Dingle and C. H. Rudd, electricians of the company. Communication was kept up with all the stations on the line as easily as if a wire had been stretched direct from the train.

The Brown Automatic Converter.

One of the most important of recent electrical inventions is the Brown Automatic Converter, shown herewith, which is designed to operate incandescent electric lamps upon arc light circuits, receiving the high tension current, and "converting" it to a safe low tension current suitable for the incandescent lamps. Ever since the Central Station system of arc lighting proved itself a commercial success there has been a demand for a similar scheme for supplying incandescent lights in rooms where the powerful arc is too strong and too expensive. The claim is made by parties of experience that the low tension current used for incandescent lamps cannot be carried economically for a greater distance than one thousand feet from the generator, and even then requires costly copper cables; that system of distribution is limited to the thickly populated districts of large cities. The arc current, on the contrary, can be carried for many miles upon a copper wire the size of a lead pencil, and with but little loss in transmission. What has long been needed is a method of operating incandescent lamps from the wires and current of an arc light system. Many inventors have tried to solve this problem, but the difficulties in their way have hitherto proved very serious. It is well known that the arc current is liable to large variations when arcs are turned off or on, and this increase of current beyond the proper amount soon weakens and destroys the filaments of the incandescent lamps. To meet this difficulty some have supplied a pair of arc light carbons which are brought together and form an arc when the current grows too strong; but these carbons needed frequent attention, and their neglect would result in destroying the lamps. Also, if during the day when the generator was not running, some of the lamps in the group were disconnected or broken, for instance, by the careless handling of a step ladder, the remaining lamps would be destroyed as soon as the current started. The problem, apparently, has at last been solved by Harold P. Brown, of Chicago, and his Automatic Converter has been subjected to a practical test of more than a year's service by the company who are now manufacturing it for the market.

The apparatus, as shown in Figure 1, is inclosed in an iron box about fourteen inches square by two and a half deep. The slate insulated box *A*, contains the resistance which is equal to that of a single lamp in the group, and is composed of a pile of thin iron plates coated with a film of iron oxide and silicate; thicker plates are inserted at intervals and the case perforated to afford ventilation. This novel form of resistance, for which a strong patent has recently been allowed, is constant, reliable and indestructible with the current used; it resembles carbon in the fact that its resistance when warm is less than when cold, but this variation is compensated for by a clever device. The main current enters at the binding post No. 1, passes through solenoid *B* and clutch magnet *F*, and divides a portion flowing to binding post No. 3, through the incandescent lamps, which are arranged in parallel through binding post No. 4 to post No. 2, and out to the main line. The remainder of the current, when less than the full number of lamps are burning, passes to the bottom of the iron resistance pile, through the first wire that happens to be dipped into the mercury contained in cup *c*, then out to binding post No. 2. The wires in the commutator bracket *Y* are arranged in a spiral, the first wire leading to post No. 2, and the second to the top of the iron pile, so that when these two only touch the mercury the entire pile is put into the shunt. The third wire leads to a lower point in the pile, and when it touches the mercury it short circuits the second wire, and thus reduces the resistance of the shunt; it will thus be evident that the higher the mercury cup *c* rises the less will be the resistance of the iron pile, and the more current will therefore flow through it. The controlling magnet *D* is of high resistance, and is in parallel with the lamps, so that, of course, any variations of the current reaching the lamps affects its strength. Its armature, as

shown in Fig. 2, projects below it, so the direction of its magnetic pull is upwards; it carries on its top a small mercury cup *H* into which dip three wires of varying lengths. The longer two lead respectively from binding post No. 1, and from the wire connecting solenoid *B* and clutch magnet *F*. It is evident that when these two wires are below the mercury surface the solenoid *B* is short circulated. The third or central wire is shorter than the others, and leads to the connection of clutch magnet *F* with post No. 3, and when this wire is also below the mercury both *B* and *F* are short circuited. When no current is flowing the weight *E* pulls the main mercury cup to its highest point, and thus reduces the shunt resistance to its minimum, or less than the current required for one lamp. If any of the lamps are broken or turned off when no current is on, the remaining ones will not be in danger of destruction when the generator starts. As soon as the current is turned on it passes through *B*, which pulls its armature *C* and mercury cup *c* downwards, through *F*, whose clutch armature *K* permits wheel *L* to turn to the right, but holds it from turning backwards, and then through the resistance and lamps. At first the relay mercury cup *H* is at its lowest position, but as the current through the lamps is increased its strength increases, and when the current reaches its normal strength *H* rises far enough to short-circuit *B* but leaves *F* still in circuit to prevent weight *E* from going downwards. Whenever a lamp is extinguished or the main current runs too high, *H* rises far enough to touch its central wire, and thus short-circuits *F*, which at once permits the weight *E* to move down, pulling cup *c* higher until the shunt is of the proper resistance, when *F* is again put in circuit and further motion stopped. This simple but sensitive mechanism needs little or no attention after it is once adjusted, and there seems to be no reason why it should get into trouble or wear out as the three sources of wear, friction, sparking and heating seem to be eliminated. The surface of the mercury is protected from oxidation by covering it with a heavy hydrocarbon; there is little or no friction and there are no springs to loose their tension, as the controlling adjustment is the weight of the relay armature *h* which can not be changed. To provide against any contingency, however, a safety cut-out is provided. Should the current run too high and the mechanism fail to work, the relay cup *H* will rise high enough to touch cut-out lever *g*, raise it and release cut-out weight *G* which then rolls off its beveled bracket and by the force of its falls, firmly locks cut-out wire *N* into a latch on post No. 1, thus short-circuiting the entire apparatus. The converter will therefore show when it needs attention by failing to light the lamps or by extinguishing them, and it must go through its motions and prove itself in good order every time the current starts before turning on the lights.

At the recent National Electric Light Convention in Baltimore, the subject of operating incandescent lamps on arc circuits was fully discussed and it was frankly admitted that the ordinary cut-out devices for the purpose were too expensive as they did not prevent the destruction of lamps, one gentleman complaining that he had lost fourteen lamps in one month out of a group of seven. A brief quotation from the discussion of the subject will be of interest in this connection.

Mr. Smith, of Jamestown, N. Y.—"I would like to ask Dr. Moses if the life of an incandescent lamp run on an arc-circuit from a very high potential, is necessarily shorter than the life of an incandescent lamp run from an incandescent machine and if so, why?"

Dr. Otto Moses—"There is only one reason; because lamps to be run sucessfully should be run at potentials. A lamp can only bear a certain amount of current. It is calculated for that, and should be invariably run at that. If a man has regular habits and goes to bed at nine and gets up at seven, and does not have any moral or religious or political troubles in the world, he will live a very long time. So with an incandescent lamp. But an arc light is a curiously and wonderfully made thing, and if you observe incandescent lamps on arc-light circuits, you will find them running at a much higher electromotive force than they ought to run. This very subject that was brought up before, of the deposition of carbon at high temperatures, can be brought to apply to that. You heat the carbon to a much higher temperature than it was intended to bear, to a point at which it loses some of its hydro-carbon substance. Then it becomes less in resistance; there is more current passes at that point, and in that way you disintegrate the lamp and destroy it. If you could afford to have an apparatus such as that seen last evening in the president's rooms (the Brown Automatic Converter), where you have a series of arrangements of incandescent lamps, and you can by throwing in corresponding resitance in case of the destruction of one of those lamps, compensate for it, and keep the lamps at a constant electromotive force. In that way it is possible to run incandescent lamps upon arc-light circuits. I would like to call the attention of the members to that apparatus upstairs. It is made by a capable young man Mr. Harold P. Brown, and has some meritorious points about it."

As Dr. Otto Moses is regarded as high authority upon incandescent lighting, his unsolicited recommendation is valuable, and his opinion, we are informed, is verified by the fact that some incandescent lamps started in the fall of 1884 upon a large-sized arc-light generator, and controlled by the Brown Converter, are still in service, and apparently as good as ever, though they have been continuously in service upon an all-night circuit. The same make of lamps used on the same kind of current, but protected only by the various cut out devices, have been very short-lived. As the Brown Automatic Converter is adapted to be used on the current from any make of arc-light generator, and with any style or kind of incandescent lamps, it is proving an extremely valuable adjunct to the business of arc lighting companies all over the country, since by its use they can provide incandescent lights on their lines wherever an arc-lamp can be operated, without the great expense of special generators and heavy conductors. Moreover, the lighting companies need provide converters only as they obtain customers for incandescent lamps instead of going through the long process of canvassing a district to get consumers for a thousand or more lights before even making a start. It is undoubtedly true that any arc-lighting company, having proper business management, can increase its income by the use of the converters. Factories and stores having their own arc-light plants, can also use the converters for lighting their offices and small rooms. The main office of the Brown Electric Company, who are in control of the United States patents of Mr. Brown, is at 400 Wood street, Pittsburgh, Pa., and their factory is located at 1 and 3 Michigan street, Chicago.

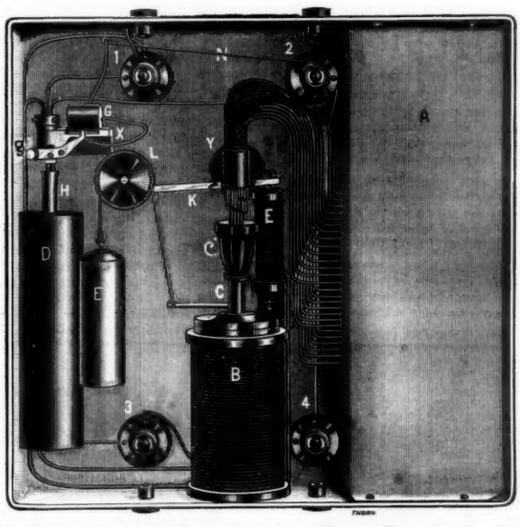

FIG. 1.—THE BROWN AUTOMATIC CONVERTER OF THE BROWN ELECTRIC CO., PITTSBURGH.

The excellence of the magnet wire manufactured by the American Electrical Works, of Providence, R. I., has become most widely known.

—— Science takes away one of the pianoforte coquette's excuses by furnishing the instrument with an electric lamp, so that "the light is rather poor" must be superseded by some other phrase.

—— Several of the new committees of the National Electric Light Association have taken up the work assigned them, and are communicating with those sources from which information should properly come. This is commendable promptness.

—— At Zanesville, O., the City Council has authorized a contract with the Western Electric Company, of Chicago, for lighting the Sixth and Fifth Street bridges with seven electric lights at $90 per year each. The company will put in a plant and have it in operation within thirty days.

—— Henry G. Bauman and James T. McMasters have secured letters patent for an electric leak alarm appliance, which is intended for use at each joint on natural gas pipe, will register leaks at any joint on the line by means of wire attachments, which communicate with an electric bell in the office of the company.

—— The Fifth Annual Edition of the Universal Electrical Directory, by J. A. Berley, of London, has just been issued from the publishing house of Wm. Dawson & Sons. It contains a record of all the industries connected with electricity and magnetism, and the names and addresses of manufacturers and dealers in Great Britain and America. Some interesting "Remarks on the Past Year," by Mr. Berley, appear in the work, covering the electrical progress of 1885.

—— The question of electric lighting versus gas is practically settled in the City of Mexico. The marked superiority of the former is so apparent here that no one would seriously consider a proposition to abandon it to return to gas. It is now rather a question of the pecuniary ability of the city to adopt an entire system of electric lighting, and the board of aldermen (the Ayuntamiento) is about to sign a contract for a continuation and extension of the present system. Eventually, it is intended to do away with gas, and to introduce a complete tower system; but, just now, such a luxury as this has to give way to the drainage of the valley, a greatly needed improvement, to which President Diaz has enthusiastically committed himself, seconded heartily by the present and past city governments. When that gigantic sanitary improvement is completed, the city will undoubtedly perfect its electric light system, and gas will be retired to back alleys and to the interior of houses. There are at present sixty Brush lights in the city circuit, and they are excellent illuminators, making the main avenues of travel brilliant after nightfall, and serving for the protection of the belated pedestrian better than a squad of mounted police. The power for these lights is derived from wood.

ELECTRIC LIGHT NEWS

—— The Freese Electric Lighting and Heating Company, Camden, N. J., has been organized with a capital stock of $500,000. William G. Hunter and others, incorporators.

—— The Westinghouse Electric Company, represented in the East by Messrs. Westinghouse, Church, Kerr & Co., have made a large number of installations during the last sixty days.

—— The St. Joseph City Council has accepted the proposition of the St. Joseph Electric Light Company to light the city with electricity. The company will put in seventy 2,000-candle-power lamps to take the place of 700 gas lamps and are to receive $180 per year per lamp.

—— The N. O. Nelson Manufacturing Co., of St. Louis, have just finished an electric lighting plant with 250 incandescent lights throughout their factory. The dynamo is of the U. S. Electric Light Co.'s make, and is driven from the factory line shaft. A 125-horse-power Atlas automatic engine drives the entire machinery with the addition of the lighting system.

—— Mr. Pope observes that terrapin in Washington is not to be classified with the same dish served up under the dictum of President Morrison. A midnight supper under such auspices, made up of the various delicacies for which Maryland is famous, leads one to endorse the wisdom of the association in selecting Baltimore for its first annual convention. In every respect it was an unqualified success.

—— Peru seems slightly in advance of some other countries, for the government has just arranged to have the principal cities lit by electricity. Coal is very costly in the Peruvian republic, and Lima and Callao are the only places that have been lighted with gas, while all others have been dependent on kerosene lamps. In most of the cities the electricity will be generated by means of running water, and the expense will thereby be marvelously reduced.

—— Mr. J. Wilson, special agent of the Brush-Swan Electric Light Company of New England, visited Worcester last week, arranging a practical demonstration of that light as to its practicability for lighting stores, factories, dwellings, and for transmission over long distances. He has arranged with Mr. S. E. Harthan for power from his shop on the Rink land, and has put in a 36-light dynamo. The light has been put into four Main street stores—those of Messrs. E. B. Clapp, O. P. Shattuck, F. A. Clapp and J. O. Bemis & Burrage. There are six lights in each store, and they were lighted last evening for the first time. The light was very much liked by those who tried it, and will probably be largely adopted.

—— Colonel A. M. Jones, of Chicago, who is known to politicians as Long Jones, and as General Logan's principal political manager, is chairman of the Republican State Committee of Illinois. He is accounted one of the best organizers in the West. Chatting with him about political manipulation, he said: "It is a curious thing that evil deeds cannot be done in daylight. There never yet was a scheme of rascality concocted and carried out in broad daylight. In one of the elections in Chicago, when I knew that the opposition had engaged a great gang of repeaters, ballot-box stuffers, shoulder hitters and ruffians to take possession of the polls as soon as night began to draw down its shadows, I quietly arranged to have an electric light flashed on every polling place in the city. In some places where the electric light could not be secured I had locomotive headlights. It cost about $4,000, but it was well worth it. The scoundrels could be seen slinking away into the alleys and shadowy places within a minute after the lights were started. They couldn't work in daylight or its substitute."

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING MARCH 2, 1886.

336,897 Electrical brush; James D. Culp, San Felipe, Cal.

336,898 Electrical torch for lighting gas; James D. Culp, San Felipe, Cal.

336,962 Regulator for dynamo-electric machines; Nikola Tesla, Smilyan-Lika, Austria-Hungary, assignor to the Tesla Electric Light and Manufacturing Co., Rahway, N. J.

336,972 Telephone call; John C. Wilson, Boston, Mass.

336,989 Distance-registering device for wheeled vehicles; Edward S. Brownson, Brooklyn, N. Y.

336,992 Electrical conductor; Henry A. Clark, Brookline, assignor, by mesne assignments, to the Eastern Electric Cable Co., Boston, Mass.

337,004 System of electric lighting; Robb Mackie, Troy, and Norman McCarthy, Hoosick, assignors to John B. Tibbits, Hoosick, N. Y.

337,005 Circuit for electric lighting; Robb Mackie, Troy, assignor to John B. Tibbits, Hoosick, N. Y.

337,010 Circuit connection for dynamo-electric machines; Norman McCarthy, Hoosick, N. Y., assignor to John B. Tibbits, same place.

337,041 Dynamo-electric machine; Foree Bain, Chicago, Ill.

337,042 Armature for dynamo-electric machine; Foree Bain, Chicago, Ill.

337,045 Cell for electric batteries; John W. Carter, Brooklyn, N. Y.

337,116 Electric leak alarm for pipes; Henry G. Bauman, Pittsburgh, Pa., assignor to himself and James T. McMaster, same place.

337,123 Meter for electric currents; Francis Borel, Cortaillod, and Emile Paccaud, Lausanne Switzerland.

337,199 Extension Electrolier; James T. Robb, New York, N. Y.

337,229 Railway time signal; Charles Barry, Corning, N. Y.

337,231 Telephone; Sigmund Bergmann, New York, N. Y.

337,232 Telephone Receiver; Sigmund Bergmann, New York, N. Y.

337,254 Telephone; Thomas A. Edison, Menlo Park, N. J., and Sigmund Bergmann, New York, N. Y.

337,272 Polarized telegraph relay; John C. Ludwig, San Francisco, Cal.

337,289 Electric arc lamp; James J. Wood, Brooklyn, assignor to the Fuller Electrical Co., New York, N. Y.

337,296 Electric light fixture; Sigmund Bergmann, New York, N. Y., assignor to Bergmann & Co., same place.

337,298 Secondary battery; Charles F. Brush, Cleveland, Ohio.

337,299 Secondary battery; Charles F. Brush, Cleveland, Ohio.

337,314 Duplex telegraph; Bette E. J. Ells, Washington, D. C.

337,334 Applying electricity for destroying living organisms in the bodies of slaughtered animals; Charles S. Jones, Chicago, Wm. W. Crooker, Waukegan, and Frederick Artos, Chicago, Ill.

337,336 Shade for electric lamps; Phillip H. Klien, Jr., New York, N. Y., assignor to Bergmann & Co., same place.

BUSINESS NOTICE.

THE HILL PATENT FIRE AND BURGLAR ALARM, Samuel M. Cortright, Mauch Chunk, Pa., sole agent for the counties of Wayne, Lackawanna, Luzerne, Columbia, Montour, Northumberland, Carbon, Schuylkill, Lehigh, Berks, Dauphin, Lebanon, and Lancaster, Pa.

The cheapest, most reliable, efficient and portable burglar and fire alarm in use in any country on the globe. Price, $4.

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Windows can be left open sufficientiy for ventilation. The slightest movement of the door knob, or of either sash, will cause an alarm.

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Good, practical alarm. I take pleasure in recommending it. WM. F. MOSHER, Machinist.

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Ain't it slick. Gentlemen, you have a fortune in that patent. J. W. LATTIG, Supt. Tel. L. V. R. R.

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Capital thing for doors of banks, stores and dwellings. THOS. L. FOSTER, Pres. 2d Nat. Bank.

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An effective burglar and fire alarm. About the completest alarm we have ever seen is now on exhibition at the American Hotel. It has three points to specially recommend it—*Effectiveness, Simplicity and Cheapness.* To appreciate it properly one must see it. *It never fails to operate.* It supplies a long felt want. ALLENTOWN DAILY CHRONICLE.

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OLIVER WILLIAMS, Pres. Catasauqua, Mfg. Co.

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JAMES JARRARD, American Hotel.

MAUCH CHUNK, PA.

Shall use it in my bed room, and give instructions to porter to turn the door knob to awaken me at my usual time for rising in the morning.
DAVID HISKEY, Clerk, American Hotel.

BETHLEHEM, PA.

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W. E. SMITH, Special Agt. Mauch Chunk, Pa.

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We are now remodeling the buildings Nos. 55 and 57 Longworth Street (just west of Race), to adapt them to the wants of tour growing business. We expect to have the alterations completed and be fully settled in our new and commodious quarters not later than March 1, 1886.

We shall carry a larger and more complete assortment of stock of Telegraph and Electrical Supplies than heretofore, and endeavor to have the latest and best. Having lost almost our entire stock of supplies in our recent fire, our new store will be stocked with new and fresh goods. In our manufacturing department we suffered almost an entire loss of our tools and serious damage to our machinery. In refitting and equipping this department we are negotiating for the most complete outfit of the very best tools and machinery on the market. We believe that the best tools and machinery are not only the cheapest in the end, but contribute vastly to the satisfaction of our customers, who patronize us in this department. Our facilities for making models and doing experimental work will be unexcelled.

We shall be pleased to have you visit us in our new location, and solicit a share or continuance of your patronage. Very respectfully,

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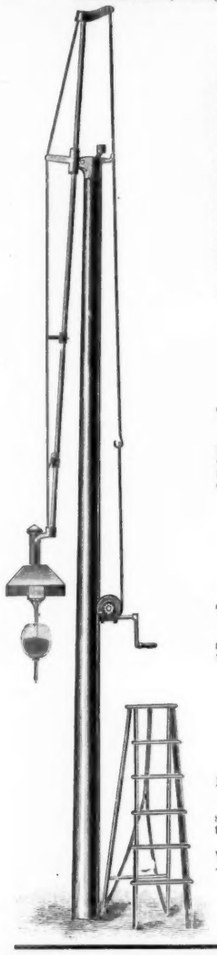

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SCHUYLER ELECTRIC LIGHT CO.,
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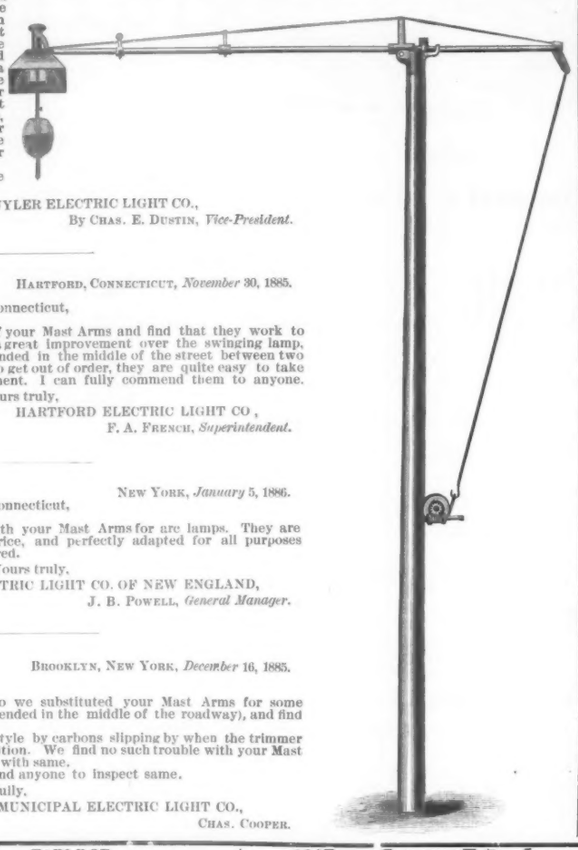

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Dear Sir.—I have used several of your Mast Arms and find that they work to perfection and also that they are a great improvement over the swinging lamp, or, in other words, a lamp suspended in the middle of the street between two poles. They are much less liable to get out of order, they are quite easy to take care of, and are quite an ornament. I can fully commend them to anyone.

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NEW YORK, *January* 5, 1886.

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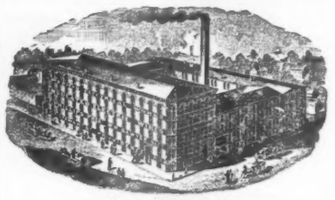

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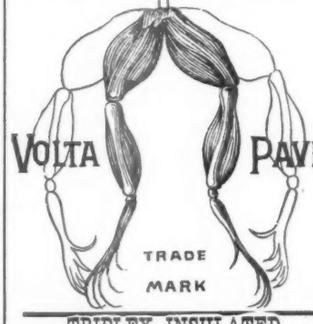

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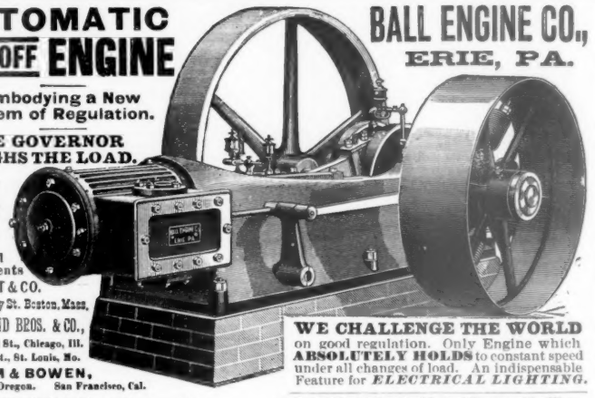

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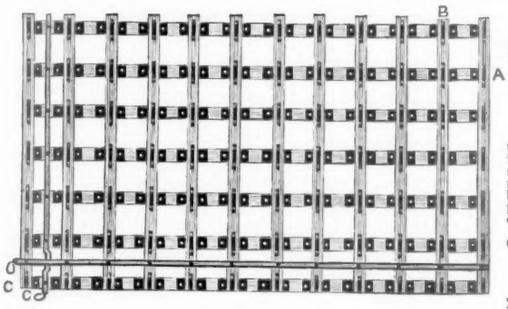

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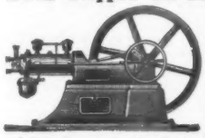

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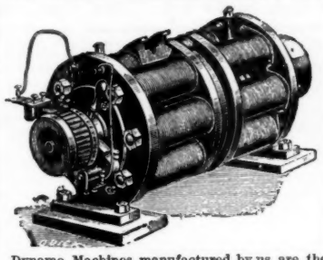

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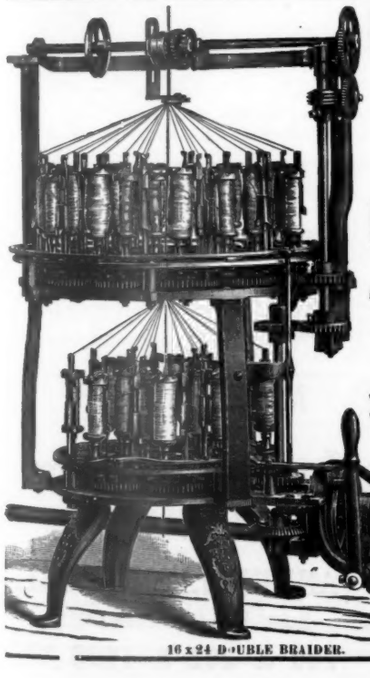

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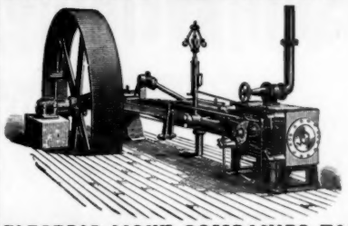

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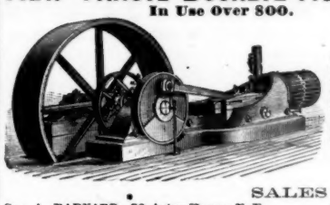

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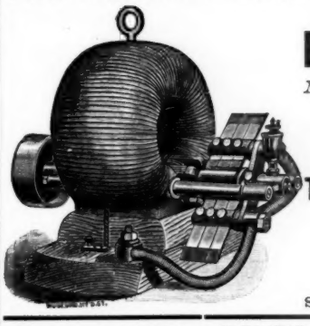

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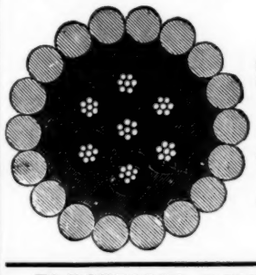

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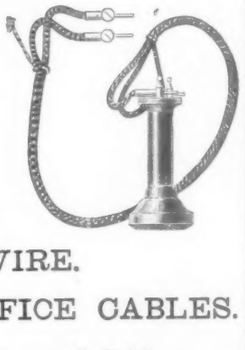

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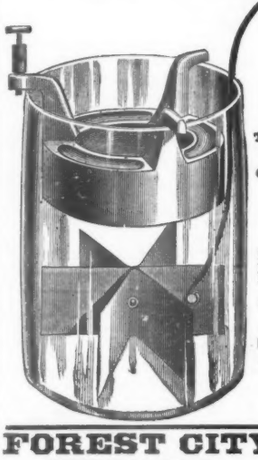

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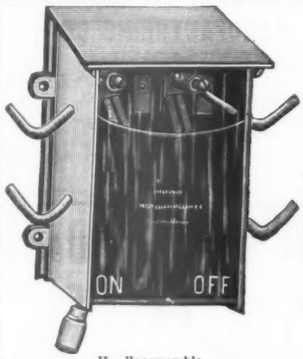

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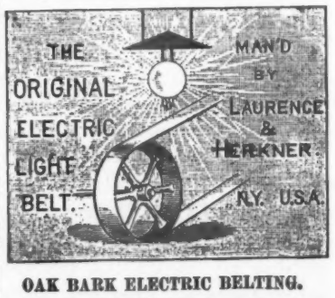

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